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The effects of age, readiness, sex, and race variables in first grade on the later reading, spelling, and arithmetic achievement and on the personal, social, and total adjustment of 1,110 culturally deprived fourth-grade pupils were studied. Readiness levels were determined by the Metropolitan Readiness Test; achievement areas were measured by the Metropolitan Achievement Test; and personality adjustment was measured by the California Test of Personality. A 4x3x2 and a 4x3x2x2 factorial design were used to analyze the data. Chronological age significantly affected only the reading scores of Negro pupils. Readiness differences significantly affected all achievement scores and personal and total adjustment, but had no significant effects on social adjustment. There were significant differences, favoring girls, in reading, spelling, social adjustment, and total adjustment. Significant differences, favoring white pupils, occurred in all three achievement areas, but no differences were noted in adjustment. Significant interactions, educational implications, suggestions for further research, and an extensive bibliography are included. (RT)

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Boston

FIRST GRADE ENTRANCE VARIABLES
RELATED TO
ACHIEVEMENT AND PERSONALITY

A STUDY OF CULTURALLY DEPRIVED FOURTH GRADERS

****

BY

ED BINKLEY

DIVISION OF PSYCHOLOGICAL SERVICES, METROPOLITAN PUBLIC SCHOOLS

NASHVILLE-DAVIDSON COUNTY, TENNESSEE

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U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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* * * * * * * *

by

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Nashville-Davidson County, Tennessee

May, 1967

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CHAPTER I

INTRODUCTION

The intellectual development which takes place in the preschool years equips the child for school entrance. The level of intellectual development depends on a multiplicity of interacting forces. Ideally, most early development takes place in the home environment (Bloom, _et al_., 1965, p. 16). In fact, according to Ilg and Ames (1965, p. 318), "There was a time when the education of young children was almost completely in the hands of their parents."

Educators are most aware of the fact that many children, especially culturally deprived children, make their initial entrance into the regular school setting ill equipped to set a pattern of successful performance. (Ilg and Ames, 1965; Bloom, _et al_., 1965)

The placement of children in inappropriate grade levels is widespread. Overplacement problems occur when children are assigned to school programs which are too advanced for the developmental level of the children involved (Ilg and Ames, 1965, p. 20; and Bloom, _et al_., 1965, p. 17f). The misplacements of children within school programs are a result of a variety of situations; situations which differ from state to state, from locale to locale. Among other things, criteria for school entrance differ among the various states. An inspection of Table I shows that for the vast majority of states chronological age is the sole criterion for entrance to first grade. State laws and current admission practices are not consistent with the large backdrop of knowledge concerning individual differences (Anastasi, 1958; Review of Educational Research, 1964).

TABLE I

AGE REQUIRED BY DIFFERENT STATES FOR ENTRANCE TO FIRST GRADE[a]

Required Date	Ages of Entrance	Number of States
No date set		11
Local decision, no statewide policy		6
6 by January 31	5-7	1
6 by December 31	5-8	11
6 by December 1	5-9	3
6 by some time in November	5-10	5
6 by some time in October	5-11	6
6 by September 1 or 15 (or merely 6)	6	9
	Total	52[b]
Median for those with a state-wide date	5-10	
Mean for those with a state-wide date	5-9	

[a] Ilg and Ames, 1965, p. 16.

[b] This includes District of Columbia and Puerto Rico.

Rigid school entrance laws based upon chronological age alone have been attacked by professional educators for decades. Recent statements by Ilg and Ames (1965, pp. 15-16) summarize the general professional opinion concerning age standards:

> Possibly the greatest single contribution which can be made toward guaranteeing that each individual child will get the most possible out of his school experience is to make certain that he starts that school experience at what is for him the "right" time. This should be the time when he is truly ready and not merely some time arbitrarily decided upon by custom or by the law.
>
> The main weakness of chronological age as a criterion for school entrance is that even if we could determine exactly the age at which the average girl or boy is ready to start kindergarten or first grade, any average would still imply that only 50% of any group of children might be expected to fall close enough to this average to insure their reasonable readiness.

Tennessee's law governing initial school entrance is based upon chronological age alone. In 1964, the Legislative Committee of the Tennessee Education Association recommended that the State Board of Education, through the Eighty-Fourth General Assembly, "Require children entering the first grade to be six years of age as of September 1 with the present age limit being moved back one month each year over a period of four years." (Tennessee Teacher, XXXI, No. 7, February 1964, p. 10) The proposal became law and presently is in effect. In trying to assess the motivation for the adoption of the current law, some educators express the opinion that this law will serve as a pressure lever to introduce public school kindergarten programs throughout the State. Even though Tennessee's school entrance law violates the principle of individual differences, the recent modifications in the law gain some support from research. Again quoting from Ilg and Ames, "If chronological age alone must be used as an entrance criterion, our experience favors the older age allowed by a September 1 date line." (1965, p. 16)

Because of a lag in state and locally sponsored kindergarten programs, for financial and other reasons, the federal government and private agencies, such as the Ford Foundation, have sponsored preschool programs for disadvantaged youngsters. The national Head Start program for preschoolers is a prime example of the above. Programs such as these emphasize the educational benefits which will result through meeting the readiness needs of preschool culturally deprived youngsters. In Compensatory Education for Cultural Deprivation, Bloom and others (1965, p. 17) recommend (among many other things): "Nursery schools and kindergartens should be organized to provide culturally deprived children with the conditions for their intellectual development and the learning-to-learn stimulation which is found in the most favorable home environments."

The recent change in Tennessee's school entrance law suggests the issue of readiness for school learning has been of concern. That individual differences in background experiences and readiness growth patterns has been recognized is evident in the many curriculum innovations observed on the educational scene. The non-graded primary unit plan and other non-graded programs represent alternative approaches to the lock-step grade-a-year plan (Goodlad, 1966). Pupil characteristics, particularly the characteristics of age, race, sex, and readiness for learning are involved in some degree in each issue, especially as they relate to making provisions for successfully educating culturally deprived youngsters.

Statement of the Problem

The problem of this study involved the exploration of several open questions regarding culturally deprived children. A general assumption regarding school entrance of middle class children has been that older school entrants have a definite advantage over younger entrants in later achievement and personality adjustment. An attempt was made in this study to test this popular assumption regarding the effects of chronological age at school entrance upon fourth grade achievement and personality adjustment. A second major aspect of the problem at hand was an attempt to assess the relative importance of measured readiness level at the time of first grade entrance upon fourth grade achievement and personality adjustment of culturally deprived children. In studies of middle class children sex differences have been reported in which girls consistently rank higher than boys on objective measures of school achievement. This study has attempted to assess not only sex differences in achievement patterns, but in personality measures as well. A final factor of importance in this study was the differential findings of Negro and white culturally deprived children for measures of achievement and personality adjustment. Typical findings in the research literature reveal that Negroes are consistently below whites in both academic attainment and personality adjustment. This study has attempted to contribute additional objective data on this matter regarding culturally deprived school children.

To recapitulate, this research was undertaken to investigate first grade entrance variables of culturally deprived pupils and to explore the extent to which these variables were reflected in later (fourth grade) school achievement and personality adjustment. First grade entrance variables by which pupils were classified included chronological age (A), measured readiness level (B), sex (C), and race (D). Fourth grade achievement measures in the basic subject areas of reading, spelling, and arithmetic computation, and three measures of personality adjustment, i.e., personal, social, and total adjustment, were used as dependent measures whereby differences among CA groups, readiness levels, sexes and races were analyzed by means of analysis of variance techniques.

Overview of Research Design

Subjects for this study were Negro and white fourth grade pupils who attended Metropolitan Nashville Public Schools which serve economically and culturally deprived neighborhoods. The following data were obtained for each child: name, date of birth, first grade readiness level, sex, race, fourth grade achievement scores on reading, spelling, and arithmetic, and three fourth grade personality adjustment measures including personal adjustment, social adjustment, and total adjustment. Data were punched on IBM cards for statistical treatment.

Four first grade entrance variables (independent variables) were used to classify pupils into sub-groupings. First grade entrance variables (main effects) included chronological age (A), first grade readiness level (B), sex (C), and race (D). Three measures of fourth grade achievement (reading, spelling, and arithmetic), and three measures of fourth grade personality adjustment (personal adjustment, social adjustment, and total adjustment) were used as dependent variables to test the main effects of the first grade entrance variables.

Two factorial designs were selected for the statistical treatment of data. A 4 x 3 x 2 factorial analysis of variance design was used in the analysis of test scores for Negro and white subjects separately. The three factors in the 4 x 3 x 2 design were chronological age (A), measured readiness level (B), and sex (C) in which there were four groups of A, three levels of B, and both C's. For combined Negro and white subjects a 4 x 3 x 2 x 2 factorial design was employed in which the fourth factor was race (D).

The Importance of the Study

Few investigations which focus upon school entrance variables of culturally deprived are found in the research literature. The vast bulk of research which considers achievement patterns of different age groupings within a given grade level has been done with middle and/or upper class children. One of the most comprehensive of these studies was authored by Devault and others (1957). In this study all schools selected were located in middle and/or upper class Anglo-American neighborhoods. In an objective attempt to set forth the limitations of their study, Devault, _et al_. (1957, p. 53) state:

> It is believed that the conclusions that are drawn from the data collected are valid as applied to the problem in the setting described. If solutions to the same problem with other types of populations are to be found, involving different racial and ethnic groups, then additional investigations will be required.

The results of the studies reviewed were also contradictory. Inadequate sampling procedures may account for these contradictory findings.

In a large proportion of the studies reviewed, the numbers of children studied were too small.

Although several investigations related school entrance age to achievement, few studies were found which include personality variables. It is well recognized that personal and social adjustment are important factors in academic growth. (Davis, 1948; and Passow, 1963) Definitive studies are needed to explore the relationships of school entrance variables to later personality adjustment as well as to academic achievement. In this study particular focus is on the culturally deprived child.

Limitations and Assumptions of the Study

The applicability of the findings of this study is limited by the following sample characteristics and other limiting factors described below. Major assumptions were considered in conjunction with the limiting aspects of the study.

Sample

Children for this study were fourth graders (1965-1966) from 39 different schools which serve economically deprived neighborhoods of Metropolitan Nashville, Tennessee. The sample was limited to subjects for whom complete information pertinent to the study was available. Information included all test scores used in this study as well as classification by age, sex, and race. Another limiting factor was the selection of pupils born within the same calendar year. This necessarily excluded from the study those fourth grade children who were over age for the grade due to retentions, temporary exclusions or for other reasons. An assumption was made that the sample characteristics were representative of the parent population from which the sample was selected with respect to the variables under consideration.

Independent Variables

Pupils for this study were categorized according to chronological age, first grade measured readiness level, sex, and Negro and white races. Comparison groups were formed using only these four variables. A multiplicity of other first grade entrance variables such as family size, intactness of family, order of birth, conditions of birth, degree of economic conditions were not considered. It was assumed that these variables would be equally distributed across age groups, levels of readiness, sex groups, and both races. Categorization by initial school readiness was determined solely by Metropolitan Readiness Test scores.

Achievement Measures

Measures of fourth grade achievement were limited to three basic areas; reading, spelling, and arithmetic computation. The Metropolitan Achievement Test (MAT) was used exclusively for obtaining achievement indices. The MAT was assumed a valid measuring instrument of achievement in the three basic areas used.

Personality Adjustment Measures

The assessment of personality adjustment was limited to the use of the California Test of Personality (CTP). Three indices of adjustment were derived; personal adjustment, social adjustment, and total adjustment.

The CTP was assumed a valid measuring instrument of personality adjustment for the three adjustment areas considered.

Educational Implications

The present research was a nomothetic study of the achievement and personality of fourth grade children from socially and economically deprived neighborhoods. The sample characteristics set the limits for making generalizations from the results of this study. For example, results regarding the relationship between CA and subsequent achievement and personality could not be applied to any individual subject under consideration. Idiographic studies are needed for pending decisions regarding individuals.

Overview of the Study

The remainder of the study consists of four chapters. Chapter II presents a review of related literature. Chapter III describes the population characteristics, tests used, and statistical procedures. Chapter IV reports the results of the study. The final chapter, Chapter V, gives a summary of the study, conclusions, and suggestions for further research.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter was to review some of the literature and research dealing with the problems associated with admission policies governing initial entrance to school. Central to this purpose is the problem of determining the "right" age for beginning the first grade. Studies relating age to subsequent school attainment and adjustment are cited. Additionally, criteria for school entrance other than age standards are reported. Early admission of academically talented students is discussed.

Historical Notes

Robert Ulich (1954, p. 63), quoting from Aristotle's Politico, cites the following:

> For children of this age, and up to seven years old, must necessarily be reared at home; so it is reasonable to suppose that even at this age they may acquire a taint of illiberality from what they hear and see.

Aristotle taught that education should be divided into two seven year periods; beginning with age seven going to age fourteen; and from puberty to age twenty-one.

According to early Jewish educational practice children were accepted into school at age six or seven. An English translation from Baba Bathra relates, "Before the age of six do not accept pupils; from that age you can accept them, and stuff them with Torah like an ox." (Ulich, 1954, p. 649)

The matter of finding an optimal age for children to begin school is an old problem. In this country from the early Colonial period to the present, age has been almost an exclusive criterion for admission to the first grade. According to Devault and others (1957, p. 13):

> Historically, children entered school when they were sufficiently mature to walk the required distance to school and to be away from home. Common experience dictated that six, seven, or eight were the acceptable ages for entering school.

Age Criterion

It is well known that age six is widely legislated as the time for youngsters to begin first grade. Compulsory school attendance laws, legislation regarding school entrance policies, and public pressures have kept first grade entrance age within a fairly narrow range. This is true for the country at large. According to an extensive survey (National Education Association, 1959) involving all school districts of one million or more population, more than four hundred urban districts, and numerous county and suburban school systems, "The most usual minimum age set for admission to first grade is 5 years, 8 to 9 months, although the range extends from 5 years, 3 months, to 6 years, 8 months." The same survey states that there is a noticeable trend toward raising the minimum age for first grade admission. The recent Tennessee law referred to in Chapter I is in line with this trend.

Petrone (1963, p. 5) substantiated that age is almost an exclusive criterion for first grade entrance by citing the results of a questionnaire sent to 643 schools. Nearly 90 per cent of these schools used age as the sole entrance requirement.

Strickland and Plichta (1949) argued that many educators refute the idea that all children should be taught to read at age six. These authors related that, "Mental age, maturity of physical and social development, facility in the use of language, and background of experience, rather than chronological age, determine a child's capacity to learn to read." A case was made, however, to establish the legal entering age at six years with emphasis on individualized instruction in order to meet the needs of all children regardless of their readiness level. Strickland and Plichta made the statement that, "At the age of six most children have intellectual interests and curiosities which the home environment does not completely satisfy . . . It is therefore the logical time for the child to enter school. . ."

Others (Maxwell, 1960; Pauley, 1951; Cone, 1955; Heinz, 1952; Gilles and Coulson, 1959; and Wright, 1946) advocated flexibility and multiple criteria for first grade entrance.

The topic of admission practices has been discussed in several notable articles by Oak-Bruce (1948), Heinz (1952), Lennon and Mitchell (1955), Forester (1955), and Shane (1960). A general discussion of school readiness and age of entrance was offered by Oak-Bruce (1948). Heinz (1952) explained several school activities which take into account the wide age variations found in first grade pupils. Lennon and Mitchell (1955) presented a thirty-five year review of trends in age-grade relationships. Forrester (1955) reported some of the findings of a study of five hundred pupils in Montclair, New Jersey. He concluded that, "Children should be five years of age or older when they enter kindergarten if they are to have a satisfactory adjustment and a good school career. . ." One may find a brief review of admission practices by Shane (1960, p. 425) in the Encyclopedia of Educational Research.

Mental Age as Criterion

The use of mental age as a criterion for first grade admission has gained widespread attention. Hildreth (1946) examined school entrance practices and observed that available research findings indicated that in the traditional first grade, children with mental ages below six years, four months at the time of entrance tend to fail.

Bigelow (1934) charted the school progress of 127 elementary school children of various ages. On the basis of her findings Bigelow emphatically concluded, "A child who is chronologically below six years and four months of age and whose mental age is below six years has practically no chance of success."

Based upon her survey of the literature and a study of New Jersey schools, Hausman (1940) summarized her report by saying that, generally, a child should not enter school unless his chronological age is six years or his mental age is six years and four months.

Stake (1960) investigated the relationship between third grade achievement test scores and mental age scores at the time of kindergarten entrance. A correlation of .57 was found between third grade achievement and mental age at the beginning of kindergarten. From the data prediction tables were set up showing the percentages of early entrance pupils of a given mental age who were expected to achieve at selected levels (percentile ranks). For example, according to Stake, one child out of five with an initial mental age of five years can be expected to achieve at the 90th percentile or above. The proportion doubles for children who start kindergarten with a mental age of six years.

Relatively few school systems use mental tests and assessment of physical and social maturity for admission to first grade. Ammons and Goodlad (1955) summarized their findings of a survey of schools with modified admission policies which permit younger children to enter school. Studies by Rowland and Nelson (1959), Birch (1954), Hobson (1948), and Wright (1946) related to the central issue of flexibility in first grade admission policies.

Rowland and Nelson (1959) analyzed a portion of a survey made by the Research Division of the National Education Association. Fifty-seven districts reported a policy of variable admission age based upon multiple criteria, including mental age. The school districts were questioned as to what prompted their flexible policy. Eight percent said they wanted to recognize individual differences; 56 percent wanted to provide for the more mature pupils; 12 percent cited school board pressures; and 12 percent reported that private kindergarten with inconsistent policies influenced their decision for flexibility. The general overwhelming response from the school districts was favorable toward flexibility in admission standards.

Birch (1954) studied 43 mentally advanced children who were admitted early to the first grade. An individual evaluation by a psychologist was made to determine the advisability of early school placement. Information for making a placement decision included: interviews or other data indicating advanced social maturity; evidence indicating excellent physical health; and evidence of superior mental ability (mental age of seven years or higher). After screening and placement a follow-up process began to determine progress and adjustment. Two major conclusions were reached by Birch, namely:

> 1. Early admission of mentally advanced children to first grade is a very promising educational procedure in the general category of provisions for acceleration in age-grade placement, if it is practiced in accord with the procedures followed for the children in this investigation.
>
> 2. Further objective evaluation is advisable through follow-up of the same children and also of other children admitted at earlier ages to determine the practical limits on age of early admission.

As a result of Hobson's study (1948) the Brookline, Massachusetts school system initiated a plan to use mental age in conjunction with chronological age as criteria for school admission. According to Devault (1957, p. 23) the Brookline plan represents ". . . one of the few attempts on the part of school leaders to place school admission on a mental maturity basis, in combination with certain chronological age requirements. . ." Recommendations from Hobson's study were:

> 1. That all children be admitted to kindergarten who will have reached the chronological age of four years and nine months by October 1 of the school year of their entrance and that all children be admitted to Grade I who will have reached the chronological age of five years and nine months by October 1 of the school year of their entrance.
>
> 2. That children within six months of these ages--that is, children between four years and three months and four years and nine months as of October 1--be admitted to kindergarten on trial upon demonstrating by psychological examination by the Department of Child Placement a mental age of five years and two months, and that children between five years and nine months as of October 1 be admitted to Grade I on trial upon demonstrating by psychological examination by the Department of Child Placement a mental age of six years and two months.
>
> 3. That all admissions of underage children on trial be subject to concurrence by the medical director following a physical examination made by him.

In 1955, some seven years after the inauguration of the Brookline plan, Cone reported a follow-up evaluation. Cone explained the Brookline plan in which the bright child who is ready for school can get a six months' earlier start in school. He commended Dr. Hobson and Dr. Coverly, superintendent of Brookline's schools, for their regard for individual differences and cited the benefits that accrue to the gifted child.

Few educators favor admission policies on the basis of mental age alone. Gates (1937) is often quoted in regard to the complexities of establishing mental age standards for teaching reading. He refuted earlier educators who advocated that a child needed a mental age of six and a half years before formal reading instruction. Gates stated that:

> . . .it has by no means been proved that a mental age of six and a half years is a proper minimum to prescribe for learning to read by all school methods, or organizations, or by all types of teaching skill and procedures. It is quite conceivable--indeed the evidence in general tends now definitely to show--that the crucial mental age will vary with the materials; the type of teaching; the skill of the teacher; the size of the class; the amount of preceding preparatory work; the thoroughness of the examination; the frequency and the treatment of special difficulties, such as visual defects of the pupil and other factors.

As with age, mental age has not been favorably regarded as a sole entrance criterion.

Sex Difference

Research studies mentioned earlier showed that there were sex differences in the scholastic achievement of young children (Devault, 1957; Carter, 1956; King, 1955; and Birch, 1954). The differences found consistently favored the girls. Gott (1963) quoted from Betts (1943) to gain support for the theory that explains sex differences in initial school readiness. Betts explained that, "In general, sex differences are found in the language development of preschool children and first grade entrants . . . sex differences in readiness for reading may be over-emphasized." Birch (1954) found that out of 43 underage children admitted to school by psychological appraisal, 29 were girls. His interpretation supported Betts' notion giving weight to the idea that girls tend to develop verbal skills earlier than boys.

Baer (1958) matched 73 underage pupils with 73 overage pupils and studied their school progress and adjustment through the eleventh grade. Baer found that the girls consistently received higher marks. The difference, however, did not increase or decrease with time. Teachers rated girls higher on personal traits. In fact, the difference between boys and girls was greater than between the overage and underage groups in three out of seven traits. The three trait descriptions were Attitude Toward School Regulations, Dependability, and Emotional Stability. King (1955) observed in her Oak Ridge, Tennessee study that boys were retained more often and had a markedly higher incidence of speech problems.

Maxwell (1960) argued for starting girls in school one year earlier than boys. He reasoned that girls are more adept at talking, and that boys have the majority of reading problems. In Maxwell's own words:

> Let's make sense. Let's use our knowledge of child growth and development. Let's fight off the mamas who want to foist the boys off on the teacher as soon as possible. Let's start the girls at five years of age and let the boys wait until they are six (or even older).

About ten years before Maxwell's statement, Pauley (1951) was advancing some of the same arguments. He asserted that boys are usually slower than girls in all developmental functions. Three educational implications, according to Pauley were:

1. If this slower maturation rate for boys is accepted, all educational and mental age norms published should be revised to provide norms for each sex.

2. In all likelihood the mental hygiene of many immature boys and their parents will be improved if a later entering age can be established for boys than for girls. There will be less frustration for boys, their parents, and their teachers if this slower development is recognized and provided for through extension of kindergarten or otherwise.

3. State legislatures should raise the legal entering age for boys and in turn provide custodial care, if needed, in some less expensive and more satisfying way educationally. (This might save taxpayers $150,000,000 to $300,000,000 nationally.) Or legislatures might lower the entering age for girls and raise the age for boys. Either alternative would give the boys a more even break in school achievement. Parenthetically, the writer believes more money should be spent on kindergarten and nursery school education, if funds are available.

Pauley presented multiple evidence from his own research in Tulsa, Oklahoma, and the research of others in support of compensating for sex differences, especially for school beginners. In April of 1959, Phi Delta Kappan presented an article in support of Pauley's conclusions. Seven months later in the same journal, Clark (1959) presented evidence which was contrary to Pauley's assertions. Clark admitted that sex differences occur but he contended that these differences are no greater than the differences found "among boys themselves and among girls themselves." Pauley's educational implications were sharply contrasted. Clark's investigation may be summarized under four major conclusions, i.e., (1) Sex differences in intelligence did not exist. For this reason, separate mental age norms were considered unnecessary. (2) No sex differences were found in basic skill areas of reading and arithmetic.

(3) Sex differences did exist in the language area. The difference particularly related to mechanics of English and spelling, (4) Wide ranges in variability in both mental ability and achievement were found at every grade level. Clark concluded that the wide variability, ". . . reminds the educator of the continuing need for dealing educationally with the individual differences of students irrespective of the sex of the pupil."

Recent studies by Parsley, Powell, and O'Connor (1964); and Gaskill and Fox (1964), in a large measure, agreed with an earlier statement by Olson (1952) which summed up the attitude of many educators regarding the issue of sex differences. Olson remarked:

> From the point of view of educational practice . . . differences between the sexes are minor when compared to differences that exist between children of the same sex.
>
> At every age girls exceed boys in reading age. This difference, however, is one of only from one to four months. The fact of greatest importance . . . is the great variability for both boys and girls . . .
>
> The dynamic solution is to be found through adjusting experiences in each grade to the nature of the children within it.

Early and Late Starters

Studies by Carter (1956), Hamalainen (1952), King (1955), and Stahuber (1961) have indicated that children who entered grade one or kindergarten at an early age had academic and school adjustment problems as compared with later starters.

Carter (1956) summarized the factors involved in the parental demands for early admission of first graders, regardless of the indications of lack of readiness for academic instruction:

1. Objection to delaying the school admission of a child who is almost six years old on September 1
2. Belief that the child is accelerated for his age
3. Increased transportation facilities
4. Employment of mothers during the day
5. Lack of space in kindergartens
6. Inadequate living conditions at home and play facilities in the neighborhood.

In an attempt to study the effects of early school entrance on the achievement of elementary school children, Carter (1956) selected 50 underage children and 50 children of normal age who were matched on IQ and sex. Comparisons were made for grades 2 through 6 using Metropolitan Achievement Test results in basic school subjects. Two conclusions from the study were that (1) older children achieved significantly more according to the measures used, and (2) some underage children were equal or superior in achievement to children of normal age, suggesting that factors other than age and IQ were operative.

Hamalainen (1952) surveyed 33 school systems and found that 24 percent of the underage children entering kindergarten had difficulty in adjustment to school as compared with 6 percent of children of normal age who had school adjustment problems. In the same study Hamalainen found that both underage and overage children face more social and emotional problems than children of normal age.

The records of Oak Ridge, Tennessee elementary school children were studied by King (1955). Data for the study included academic achievement, attendance, promotions, and social-personal adjustment. Significant findings led King to conclude that the younger first grade entrants had more difficulty attaining academic skills, repeated grades in larger numbers, attended school more irregularly, and had more indications of poor personal-social adjustment in school.

Stahuber's (1961) results lend support to King's conclusions. Research findings regarding the achievement and adjustment of early and late starters have been contradictory. In a study by Petrone (1963) it was concluded that, "Age appears to be of very limited value when employed as the only entrance criterion." Ilika (1963) studied the age of school entrance related to scholastic achievement. Comparisons were made by age as well as by grade. In brief, Ilika found that when comparisons were made at age ". . . the early entrants gained an initial advantage." This advantage, however, was lost with age. Ilika concluded, "The results, therefore, tend to support the proposition that an early start will not result in significant gains of long-term duration. . ." With respect to comparisons by grade, Ilika consistently reported that late entrants (older group) attained higher mean total achievement. Contradictory findings were reported by Bellino (1963) who studied mental and educational growth patterns related to school entrance age. Bellino found that:

> 1. In spite of the fact that the children were from the same community and entered school at the same time, the mean intelligence quotient of the younger children in the first grade was consistently higher than that of the older children.
>
> 2. At all grade levels, the mental age difference between the younger and older children was decidedly less than might be expected on the basis of their chronological age difference.
>
> 3. . . . the mental age difference between the younger and older children in a grade tended to decrease as they proceeded through school. By the time the younger and older children

> reached the sixth grade, there were no significant differences in their mental ages.
>
> 4. . . . it was found that, with the possible exception of reading in the first grade, the younger children in a grade achieve as well as the older children in the major school subjects.

Tenhoff (1962) studied various conditions associated with readiness for school entrance of children whose birth dates fell in September, October, November, or December. One significant finding was that the probability for success was the same for the various age groups.

A large scale study of underage first graders was conducted by Devault (1957). The study involved middle and upper status Anglo-American neighborhoods. Underage first graders were operationally defined as those children whose sixth birthdates were in September, October, November, or December after entering the first grade. Achievement and social adjustment were studied for children in grades 2, 4, and 6. Some major findings of the study include the following: (1) Pupils with high mental age had higher achievement and adjustment scores than pupils with middle or lower mental ages. Achievement was more related to mental age than were areas of personal and social adjustment. (2) Results relative to ages and mental age were inconsistent, i.e., some of the youngest pupils were most successful and some the least successful. (3) For the most part, pupils more than two months underage had lower achievement test scores than the normal-age pupils or those pupils less than two months underage. (4) Pupils from one day up to two months underage had achievement and adjustment scores comparable to those of the normal-age pupils.

In a current study, McHugh (1966) hypothesized that there would be no differences in achievement and adjustment between matched groups of high school students of differing ages. After examining high school grades, attainment of honors, personality ratings, and psychological referrals, the null hypotheses were accepted. Older and younger subjects did not differ with respect to achievement and adjustment.

McCarthy (1955) investigated pre-entrance variables and school success of underage children. Twelve pre-entrance variables were specified and studied. These were: (1) intelligence, (2) reading readiness, (3) home environment, (4) home instruction, (5) sibling relationships, (6) types of group experiences, (7) relationships in groups, (8) self-reliance, (9) emotional stability, (10) health, (11) physical characteristics, and (12) motor coordination. The relationship between the above variables, academic achievement, and social adjustment were studied. For underage boys, it was found that *intelligence*, *reading readiness*, *home instruction*, and *types of group experiences* were significantly related to achievement criteria only. For underage girls, *types of group experiences* was the only pre-entrance variable related to success in achievement but not to success in social adjustment. Other findings, as stated by McCarthy were:

> For boys, only one variable was found to be significantly related to success that included both social and achievement criteria--*home environment*.
>
> For girls seven of the pre-entrance variables were found to be significantly related to success in achievement criteria and in social adjustment criteria. These were intelligence, reading readiness, home environment, home instruction, relationships in groups, self-reliance, and emotional stability.

Hampleman (1959) conducted a limited study involving 58 sixth grade children who were divided into two comparison groups. No statistical differences in reading achievement were found between early and late school starters. Similarly, Hurly (1964) found that achievement patterns of early and late starters were uneven through the elementary grades.

The academic achievement and social adjustment of thirty-seven underage children was studied by Miller (1957). Miller's data led her to conclude that underage children have a good chance for success both academically and socially.

Acceleration of Academically Talented through Early Admission

The advantages of early school entrance for gifted children have been examined by Anderson (1961). He wrote that, "It avoids breaking up any established peer group relationships and results in continual academic challenge to the child instead of the boredom of lock-step."

Birch (1954), McCandless (1957), Hobson (1956), and Worcester (1959) recommended acceleration of academically talented children through early entrance into the first grade (or kindergarten). Reynolds (1962) edited a special publication for the Council for Exceptional Children which reviewed the research and practice relating to early school admission to advanced children. After investigating the literature, Reynolds concluded ". . . that early admission to school of mentally advanced children who are within a year of the ordinary school-entrance age and who are generally mature is to their advantage."

One is reminded of Terman's (1930) early studies of gifted youngsters and the consistent recommendation of moderate acceleration of gifted children. In fact, the overwhelming evidence from research studies favor acceleration of gifted youngsters. Thompson and Meyer (1961) give a brief review of research about acceleration. These authors concluded that research findings support the following:

1. Research suggests acceleration is a feasible method to meet the needs of the superior child.
2. Acceleration enables him to complete schooling earlier and has no adverse effects upon the child.
3. Early entrance to school provides continuity to a child's education.
4. Acceleration should not be done at random but by careful study.

Research findings by Weiss (1962) did not favor early-age children entering kindergarten. Weiss compared 35 children who were admitted early with a matched group of 161 normal-age children. When comparisons were made, early-age children had lower teacher ratings, social status, and personality adjustment than normal-age children of comparable IQ.

A fairly comprehensive treatise on acceleration of mentally advanced children was written by Worcester (1956), who reviewed selected educational projects.

Summary

From a historical point of view the optimal age for initial school entrance has been an educational and practical issue dating back to or before the days of the early Greeks. In this country age has been used almost exclusively as a criterion for initial school entrance (Petrone, 1963).

A number of investigators, particularly educators (Maxwell, 1960; Pauley, 1951; Cone, 1955), have advocated multiple criteria for first grade entrance. Oak-Bruce (1948) and Heinz (1952) explained a number of factors including children's readiness and the wide age variation found in first grade pupils. Several studies have indicated that age standards may be successfully combined with measures of mental maturity. The relationship between age, mental age, and school success has been reported in studies by Hildreth, 1946; Bigelow, 1934; Hausman, 1940; Stake, 1960; Ammons and Goodlad, 1955; and others. A general conclusion by the above was that both age and mental maturity should be considered in setting school entrance policies. Flexibility in first grade admission policies was strongly indicated by Rowland and Nelson, 1959; Birch, 1954; Hobson, 1948; and Wright, 1946.

Many comparisons on the basis of sex have shown that girls score significantly higher than boys on achievement tests (Devault, 1957; Carter, 1956; King, 1955; and Birch, 1954; and Baer, 1958). Pauley (1951) advanced the proposal that girls should begin school earlier than boys to compensate for sex differences in maturation. A few years later Maxwell (1960) made the same plea. Clark (1959) presented evidence to the contrary. He argued that educators should deal with the individual needs of students irrespective of the sex of the individuals. The studies of Parsley, Powell and O'Connor (1964); and Gaskill and Fox (1964) found the usual sex difference. Conclusions from these studies were consistent with observations by Olson (1952). Briefly, Olson points out that: (1) sex differences are minor when compared with differences found within the same sex; (2) girls slightly exceed boys in reading at every age, but; (3) the great variability within both sexes is more important than the differences between sexes.

Results of studies by Carter (1956), Hamalainen (1952), King (1955), and Stahuber (1961) have indicated that children who entered school at an early age had academic and adjustment problems as compared with later entrants. Ilika (1963) studied age related to achievement and found that early entrance into school did not result in significant gains of long-term duration. Ilika also reported that late entrants (older group) achieved more than early entrants (younger group) when comparisons were made by grade. Bellins (1963), and Tenhoff (1962) submitted results which were contradictory to the findings of Carter, Hamalainen, King, Stahuber, and Ilika. Devault (1957) found that pupils more than two months underage had lower achievement test scores than normal-age pupils. Results relative to ages and mental age were inconsistent. In a study of matched groups of high school students of differing ages McHugh (1966) found no significant differences in achievement or adjustment. Studies by Hampleman (1959), and Miller (1957), support the same general conclusion reached by McHugh.

The acceleration of academically talented pupils through early admission to school has received overwhelming support from research evidence. Research reviews on acceleration were presented by Worcester (1956), Anderson (1961), Thompson and Meyer (1961), and Reynolds (1962). Acceleration of academically talented children through early entrance into the first grade has been recommended by Birch (1954), McCandless (1957), Hobson (1956), and Worcester (1959). Results of a study by Weiss (1962), however, did not favor early-age children entering kindergarten.

CHAPTER III

PROCEDURES OF THE STUDY

The object of this study was to explore a variety of school entrance variables and the influences which these variables had on subsequent achievement and personality test measures. School entrance variables studied included age (A), measured readiness level (B), sex (C), and race (D). Sources of data for the study, tests used, description of the sample population, and statistical procedures are described in this chapter.

Sources of Data

Selection of Schools and Subjects

*Thirty-nine elementary schools in the Metropolitan Nashville-*Davidson County School System were selected from a total of 104 elementary schools within the Sy[illegible] Each of the 39 schools was approved for Project Number Five, A Program of Compensatory Efforts for the Educationally and Culturally Deprived of Metropolitan Nashville-Davidson County provided by Title I of the Elementary and Secondary Education Act of 1965. A total of 1110 children were selected for this study. Only those children who were born in the calendar year of 1956 and whose records included all pertinent data relative to the study were incorporated into the study.

Source Documents

Source documents containing all necessary information were made available through the cooperation of Mrs. Virginia Dobbs, Director of Project Number Five, and her staff. Data for the source documents were obtained from pupils' cumulative records by a full-time staff of 17 workers within a period of approximately two months. Data from the source documents were transferred to IBM cards and were verified. A print-out program was written by Mr. John Wilson, Program Analyst for IBM. This facilitated initial inspection of data. Population characteristics were identified readily from the initial print-out sheets.

Tests Used

All tests used for this study were a part of the system-wide testing program of the Metropolitan Nashville-Davidson County School System, except the California Test of Personality. Most of the readiness tests and achievement tests were administered by classroom teachers. The California Test of Personality was administered by specially hired workers for Project Number Five. Readiness tests were given early in the fall of 1962 just following first grade entrance. Measures of achievement were obtained in October of 1965. Personality tests were administered to the same students in March, 1965. All tests were scored electronically.

Readiness Tests. Initial school readiness was measured by the MRT, Metropolitan Readiness Test (Hildreth and Griffiths, 1949). The MRT manual provides the following Letter Ratings and corresponding

Readiness Status:

Letter Rating	Readiness Status
A	Superior
B	High Normal
C	Average
D	Low Normal
E	Poor Risk

Percentile ranks also are available in the examiner's manual. In this study, MRT scores were used to categorize students into three levels of readiness; Above Average, Average, and Below Average. The operational procedure for making assignments follows:

Letter Rating	Category
A and B	Above Average
C	Average
D and E	Below Average

Achievement Tests. Academic achievement in the basic areas of Reading, Spelling, and Arithmetic Computation was measured by the Metropolitan Achievement Tests, Elementary Battery (Durost, *et al.*, 1962). The manual for the Metropolitan Achievement Tests contains four separate kinds of converted scores, i.e., standard scores, grade equivalents, percentile ranks, and stanines. For statistical appropriateness standard scores were used for the study. The MAT standard score is a normalized score having a mean of 50 points and a standard deviation of 10 points.

Personality Tests. Personality adjustment was measured by the California Test of Personality, Elementary Level (Thorpe, et al., 1953). The CTP has been used widely but not as extensively as the MRT or the MAT. For this reason further description is included. In an attempt to appraise the CTP, the 1966 *Standards for Educational and*

Psychological Tests and Manuals (American Psychological Association) was used to devise a test appraisal form. Several group tests of personality were compared using the appraisal form. An objective rating system was employed to quantify the outcome of the comparisons. Judgments were based upon statements by authorities in testing (Buros, 1965; Horrocks, 1964; Freeman, 1962; and Anastasi, 1961). The outcome of the various ratings favored the CTP by an overwhelming margin. Some comments relative to the CTP may clarify the usefulness of the instrument.

The CTP consists of five forms representing successive developmental levels from approximately 5 years of age through adulthood. This offers an advantage especially in developmental research. Two major scoring categories presented are Personal Adjustment and Social Adjustment. Also, a Total Adjustment score may be obtained. Scores are presented as standard scores and percentiles. Information within the manual and test material is relatively complete. Buros' (1965) Sixth Mental Measurement Yearbook lists 166 references to the CTP. Buros refers to several reviews in previous yearbooks.

Relative to validity, Sims (1959) noted that the CTP ". . . as a measure of self-concept in the . . . vaguely defined area called adjustment . . . is as valid as most instruments."

Based upon the evidence reviewed, the two major purposes of the CPT deemed appropriate are: (1) as a screening device, and (2) for research.

Three CPT measures (standard scores) were used in this study, namely: Personal Adjustment, Social Adjustment, and Total Adjustment. The CPT standard score is a normalized score having a mean of 50 points and a standard deviation of 10 points.

Description of Data

Children in the Study

There was a total of 1110 fourth grade children used in this study. Children were selected from 39 different schools which serve neighborhoods which are predominantly economically and socially disadvantaged.

The total population of 1110 subjects was divided among subpopulations according to chronological age, readiness, sex, and race. All children were born in the calendar year of 1956.

Four age groups were formed based upon the quarter of the year. Age groups were designated as follows:

A_1 January, February and March Births
A_2 April, May, and June Births
A_3 July, August, and September Births
A_4 October, November, and December Births

Three levels of initial school readiness were determined using previous results of the Metropolitan Readiness Test. Levels were:

B_1 Above Average (A and B MRT ratings)
B_2 Average (C MRT rating)
B_3 Below Average (D and E ratings)

For each age group and for each level of readiness sex was designated accordingly:

C_1 Boys
C_2 Girls

TABLE II

DISTRIBUTION OF FOURTH GRADE POPULATION BY AGE, RACE, AND SEX

		Number of Pupils by Chronological Age Groups				
Race	Sex	A_1	A_2	A_3	A_4	Total
Negro	M	99	61	77	68	305
	F	82	80	126	79	367
	Total	181	141	203	147	672
White	M	57	47	63	45	212
	F	65	44	69	48	226
	Total	122	91	132	93	438
Total Population	M	156	108	140	113	517
	F	147	124	195	127	593
Summary Total		303	232	335	240	1110

TABLE III

DISTRIBUTION OF FOURTH GRADE POPULATION BY FIRST GRADE READINESS, RACE, AND SEX

Race	Sex	Number of Pupils by Readiness Levels			Total
		B_1	B_2	B_3	
Negro	M	71	82	152	305
	F	77	122	168	367
	Total	148	204	367	672
White	M	70	83	59	212
	F	77	82	67	226
	Total	147	165	126	438
Total Population	M	141	165	211	517
	F	154	204	235	593
Summary Total		295	369	446	1110

TABLE IV

DISTRIBUTION OF FOURTH GRADE POPULATION BY SEX AND RACE

	Sex		
Race	Male	Female	Total
Negro	305	367	672
White	212	226	438
Total	517	593	1110

Race designations were:

D_1 Negroes

D_2 Whites

Tables II, III, and IV present the distribution of children included within each of the above categories, i.e., age, readiness, sex, and race.

Statistical Design

For the statistical treatment of the data, analysis of variance techniques were used. In keeping with the purpose of the study, that of exploring the effects of first grade entrance variables upon later school achievement and adjustment, a factorial design was chosen to help determine significant differences among various sub-groupings. The design is flexible enough to test the significance of each variable under study and the interactions of all the combinations of variables.

Data for Negro and white samples were analyzed by a 4 x 3 x 2 factorial design. There were four age groups, three levels of readiness, and the two sex groups. Data for the total sample were analyzed by a 4 x 3 x 2 x 2 factorial design in which race added the fourth variable. The formation and designation of these variables were explained earlier in this chapter.

Separate analyses were done for each of three achievement areas (Reading, Spelling, and Arithmetic Computation) and three personality adjustment dimensions (Personal Adjustment, Social Adjustment, and Total Adjustment). Analyses were done by race separately and combined. Thus, a total of 18 separate factorial studies was completed. Analyses were programmed and printed by the University of Tennessee Computer

TABLE V

ANALYSIS OF VARIANCE DESIGN

Chronological Age Group		Levels of Readiness		
		Above	Average	Below
Jan., Feb., March	Boys			
	Girls			
April, May, June	Boys			
	Girls			
July, Aug., Sept.	Boys			
	Girls			
Oct., Nov., Dec.	Boys			
	Girls			

TABLE VI

DISTRIBUTION OF NUMBERS OF SUBJECTS WITHIN EACH CELL

Age	A_1						A_2						A_3						A_4					
Readiness	B_1		B_2		B_3		B_1		B_2		B_3		B_1		B_2		B_3		B_1		B_2		B_3	
Sex	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2
Negro Population, N = 672																								
	29	22	29	28	41	32	17	15	15	30	29	35	14	27	19	36	44	63	11	13	19	28	38	38
White Population, N = 438																								
	25	27	23	23	9	15	14	15	19	18	14	11	15	26	29	19	19	24	16	7	12	22	17	17
Total Population, N = 1110																								
	54	49	52	51	50	47	31	30	34	48	43	46	29	53	48	55	63	87	27	22	31	50	55	55

Center under the direct supervision of Mrs. Sarah Miravale, Statistical Consultant.

Table V presents the analysis of variance design used in this study.

In the 4 x 3 x 2 factorial design there are 24 sub-groups or cells. There are 48 sub-groups or cells in the 4 x 3 x 2 x 2 factorial design. In this study the number of subjects within cells varied. The distributions within cells are presented in Table VI.

Summary

Data reported above pertain to 1110 fourth grade (1965-66) youngsters who attended 39 different schools in Metropolitan Nashville Public Schools. Schools were selected as those serving economically and culturally disadvantaged neighborhoods. All schools qualified for Project Number Five, a program of compensatory efforts for educationally and culturally deprived youngsters authorized by Title I of the Elementary and Secondary Education Act of 1965.

The purpose of the study was to explore possible effects of school entrance age, first grade readiness, sex, and race upon later school achievement and personality test scores. Statistical procedures described above were carried out. The results of the study are described in the next chapter.

CHAPTER IV

PRESENTATION OF RESULTS

The major intent of this study was to explore the relationships of first grade entrance variables with later achievement and personality adjustment of culturally deprived children.

School entrance variables included chronological age (A), school readiness level (B), sex (C), and race (D). Three measures of achievement included reading, spelling, and arithmetic computation. Measures of personality adjustment were personal, social, and total adjustment. A sample of 1110 fourth grade children selected from 39 elementary schools which serve economically deprived neighborhoods was used in the study. Divided by race, there were 672 Negro children and 438 white children. In this chapter analyses are presented for three groups: Negro, white, and total. A 4 x 3 x 2 factorial design was used for the first two groups for each of the achievement and personality measures (Reading, Spelling, Arithmetic, Personal Adjustment, Social Adjustment, and Total Adjustment). A 4 x 3 x 2 x 2 factorial design was used for the total group for each of the achievement and personality measures. In review, there were four age groups, three levels of readiness, and both sex groups in the 4 x 3 x 2 design. Race added the fourth variable in the 4 x 3 x 2 x 2 total sample analyses.

Description of Tables

The major findings of this study are presented in the following tables. An analysis of variance table is presented for each measure of achievement and personality for the three groups (Negro, white, and total). Preceding each analysis of variance table is a table of means corresponding to the analysis of variance table under consideration. For the most part, tables are self-explanatory. Some clarification, however, may be needed for chronological age groups.

Tables which present means identify chronological age groups by Roman numerals. Chronological age (CA) groups run from oldest (CA group I) to youngest (CA group IV). CA group I includes subjects born in the first quarter of the calendar (January, February, and March). CA group II designates second quarter births; CA group III, third quarter births; and CA group IV, fourth quarter births.

Analyses of Reading Scores

Reading Analysis - Negro Sample

The mean reading achievement standard scores of a sample of 672 fourth grade Negro children (Table VII) for the four chronological age groups were 46.5, 44.8, 45.7, and 44.5, respectively. The analysis of variance (Table VIII) indicated that chronological age group differences in mean reading achievement were significant at the .05 level of confidence. The mean reading score for CA group I was significantly higher than the mean reading scores for CA groups II and IV. The mean reading achievement scores for the three readiness levels were 48.5, 45.4, and 42.3. These differences were significant at the .01 level of confidence. The observed sex difference was not significant and there were no significant interactions.

TABLE VII

MEAN READING SCORES OF 672 FOURTH GRADE NEGRO CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

		Readiness Level			
Chronological Age Group	Sex	Above Average	Average	Below Average	Total
I	M	50.7	45.0	41.8	45.9
	F	49.5	48.9	43.4	47.2
	Total	50.1	46.9	42.6	46.5
II	M	45.3	44.7	41.2	43.7
	F	50.1	44.5	43.3	46.0
	Total	47.7	44.6	42.2	44.8
III	M	51.0	44.9	42.9	46.3
	F	48.6	45.0	41.8	45.2
	Total	49.8	45.0	42.3	45.7
IV	M	44.2	43.6	42.9	43.6
	F	48.3	46.6	41.2	45.4
	Total	46.2	45.1	42.1	44.5
Total	M	47.8	44.6	42.2	44.9
	F	49.1	46.3	42.4	45.9
	Total	48.5	45.4	42.3	44.7*

* Overall mean

TABLE VIII

ANALYSIS OF VARIANCE FOR READING SCORES OF 672 FOURTH GRADE NEGRO CHILDREN

Source	df	MS	F
Age (A)	3	5.13	2.66*
Readiness (B)	2	75.47	39.08**
Sex (C)	1	6.92	3.58
Age x Readiness (AB)	6	1.90	.99
Age x Sex (AC)	3	3.37	1.74
Readiness x Sex (BC)	2	1.22	.63
Age x Readiness x Sex (ABC)	6	3.54	1.83
Within Error	648	1.93	

* Significant at .05 level of confidence

** Significant at .01 level of confidence

Reading Analysis - White Sample

The data in Table IX and Table X present results of the analysis of reading scores for 438 fourth grade white children. Mean reading scores for the upper, middle, and lower levels of readiness were 54.8, 49.5, and 44.6, respectively. These differences between readiness levels were significant at the .01 level of confidence. The mean reading score for girls was 50.7 and the mean reading score for boys was 49.0. The difference between boys and girls was significant at the .05 level of confidence. Differences related to CA were not significant, and no interactions were significant.

Reading Analysis - Total Sample

For the total sample of 1110 fourth grade children, results of the reading analysis are shown in Table XI and Table XII. The mean reading scores of pupils in the above average, average, and below average readiness levels were 51.6, 47.4, and 43.8 respectively. The analysis of variance indicated that these differences were significant at the .01 level of confidence. Mean reading scores for boys and girls were 46.9 and 48.3, respectively. These differences were significant ($p < .01$). Mean reading scores for Negro pupils and white pupils were 45.4 and 49.9 respectively; these differences were significant ($p < .01$). Differences related to CA were not significant. A significant interaction (.05) between CA and sex was found. This was related to the fact that the mean reading scores for girls in CA groups II and IV were significantly higher than the mean reading scores for boys in these groups, whereas the same

TABLE IX

MEAN READING SCORES OF 438 FOURTH GRADE WHITE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

Chronological Age Group	Sex	Readiness Level: Above Average	Average	Below Average	Total
I	M	53.4	50.4	45.7	49.8
	F	55.9	48.2	46.3	50.1
	Total	54.6	49.3	46.0	50.0
II	M	51.1	50.2	45.0	48.7
	F	55.1	50.2	47.1	50.8
	Total	53.1	50.2	46.0	49.8
III	M	57.7	47.3	45.1	50.0
	F	53.3	51.8	45.3	50.1
	Total	55.5	49.6	45.2	50.1
IV	M	52.8	47.1	42.6	47.5
	F	59.3	50.6	45.5	51.8
	Total	56.0	48.8	44.1	49.6
Total	M	53.7	48.7	44.6	49.0
	F	55.9	50.2	46.0	50.7
	Total	54.8	49.5	45.3	49.9*

* Overall mean

TABLE X

ANALYSIS OF VARIANCE FOR READING SCORES OF 438 FOURTH GRADE WHITE CHILDREN

Source	df	MS	F
Age (A)	3	.22	.07
Readiness (B)	2	181.04	60.04**
Sex (C)	1	17.40	5.77*
Age x Readiness (AB)	6	2.71	.90
Age x Sex (AC)	3	5.67	1.88
Readiness x Sex (BC)	2	.36	.12
Age x Readiness x Sex (ABC)	6	5.51	1.83
Within Error	414	3.02	

* Significant at .05 level of confidence

** Significant at .01 level of confidence

TABLE XI

MEAN READING SCORES OF 1110 FOURTH GRADE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, SEX AND RACE

		Readiness Level											
		Above Average			Average			Below Average			Totals		
Chronological Age Group	Sex	Negro	White	Total	Negro	White	Total	Negro	White	Total	Negro	White	Total
I	M	50.7	53.4	52.0	45.0	50.4	47.7	41.8	45.7	43.7	45.9	49.8	47.8
	F	49.5	55.9	52.7	48.9	48.2	48.5	43.4	46.3	44.9	47.2	50.1	48.7
	Total	50.1	54.6	52.3	46.9	49.3	48.1	42.6	46.0	44.3	46.5	50.0	48.3
II	M	45.3	51.1	48.2	44.7	50.2	47.4	41.2	45.0	43.1	43.7	48.7	46.2
	F	50.1	55.1	52.6	44.5	50.2	47.4	43.3	47.1	45.2	46.0	50.8	48.4
	Total	47.7	53.1	50.4	44.6	50.2	47.4	42.2	46.0	44.1	44.8	49.8	47.3
III	M	51.0	57.7	54.3	44.9	47.3	46.1	42.9	45.1	44.0	46.3	50.0	48.1
	F	48.6	53.3	50.9	45.0	51.8	48.4	41.8	45.3	43.5	45.2	50.1	47.6
	Total	49.8	55.5	52.6	45.0	49.6	47.3	42.3	45.2	43.8	45.7	50.1	47.9
IV	M	44.2	52.8	48.5	43.6	47.1	45.4	42.9	42.6	42.8	43.6	47.5	45.5
	F	48.3	59.3	53.8	46.6	50.6	48.6	41.2	45.5	43.3	45.4	51.8	48.6
	Total	46.2	56.0	51.1	45.1	48.8	47.0	42.1	44.1	43.1	44.5	49.6	47.1
Total	M	47.8	53.7	50.8	44.6	48.7	46.7	42.2	44.6	43.4	44.9	49.0	46.9
	F	49.1	55.9	52.5	46.3	50.2	48.2	42.4	46.0	44.2	45.9	50.7	48.3
	Total	48.4	54.8	51.6	45.4	49.5	47.4	42.3	45.3	43.8	45.4	49.9	46.8*

* Overall mean

TABLE XII

ANALYSIS OF VARIANCE FOR READING SCORES OF 1110 FOURTH GRADE CHILDREN

Source	df	MS	F
Age (A)	3	3.56	1.47
Readiness (B)	2	244.80	100.92**
Sex (C)	1	23.12	9.53**
Race (D)	1	240.67	99.22**
Age x Readiness (AB)	6	1.52	.63
Age x Sex (AC)	3	7.18	2.96*
Age x Race (AD)	3	1.79	.74
Readiness x Sex (BC)	2	.98	.41
Readiness x Race (BD)	2	11.71	4.83**
Sex x Race (CD)	1	1.20	.49
Age x Readiness x Sex (ABC)	6	6.01	2.48*
Age x Readiness x Race (ABD)	6	3.09	1.28
Age x Sex x Race (ACD)	3	1.86	.77
Readiness x Sex x Race (BCD)	2	.60	.25
Age x Readiness x Sex x Race (ABCD)	6	3.04	1.25
Within Error	1062	2.43	

* Significant at the .05 level of confidence

** Significant at the .01 level of confidence

pattern was not true for CA groups I and III. Girls scored higher than boys in CA group I and the reverse was true in CA group III in which boys scored higher than girls. A significant interaction ($p < .01$) between readiness level and race was found. Across levels of readiness there were significant differences in mean reading scores and white pupils consistently scored higher than Negro pupils. The magnitude of these differences, however, changed for levels of readiness. For the above average level of readiness the difference between races was more than twice as large as differences found in the below average level of readiness. A triple interaction between CA, readiness level, and sex was significant ($p < .05$). It is evident that the effect of sex was not the same at each CA level. In addition, the interactions between readiness and sex were not the same for CA levels. Table XI shows that in the CA group III boys exceeded girls in the above average and the below average levels of readiness.

Analyses of Spelling Scores

Spelling Analysis - Negro Sample

Mean spelling achievement scores for a sample of 672 fourth grade Negro pupils are shown in Table XIII. Table XIV presents a summary of the analysis of variance data based on these scores. The mean spelling scores for the above average, average, and below average readiness levels were 52.3, 50.2, and 46.6, respectively. The main effect of readiness was significant at the .01 level of confidence. The mean score for boys was 48.6 and the mean score for girls was 50.8. The sex difference was significant at the .05 level of confidence.

TABLE XIII

MEAN SPELLING SCORES OF 672 FOURTH GRADE NEGRO CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

Chronological Age Group	Sex	Readiness Level			Total
		Above Average	Average	Below Average	
I	M	53.1	48.0	45.7	48.9
	F	55.9	54.2	49.5	53.2
	Total	54.5	51.1	47.6	51.1
II	M	50.6	49.7	44.2	48.2
	F	53.5	48.8	46.7	49.6
	Total	52.1	49.3	45.5	48.9
III	M	55.2	49.1	47.8	50.7
	F	52.0	50.5	47.2	49.9
	Total	53.6	49.8	47.5	50.3
IV	M	46.4	48.5	45.4	46.8
	F	52.1	52.8	45.9	50.3
	Total	49.2	50.7	45.6	48.5
Total	M	51.3	48.8	45.8	48.6
	F	53.4	51.6	47.4	50.8
	Total	52.3	50.2	46.6	49.1*

* Overall mean

TABLE XIV

ANALYSIS OF VARIANCE FOR SPELLING SCORES OF 672 FOURTH GRADE NEGRO CHILDREN

Source	df	MS	F
Age (A)	3	8.51	2.04
Readiness (B)	2	68.54	16.44**
Sex (C)	1	26.79	6.43*
Age x Readiness (AB)	6	3.13	.75
Age x Sex (AC)	3	7.78	1.87
Readiness x Sex (BC)	2	.65	.16
Age x Readiness x Sex (ABC)	6	3.11	.75
Within Error	648	4.17	

* Significant at .05 level of confidence

** Significant at .01 level of confidence

Differences related to CA were not significant, and there were no significant interactions.

Spelling Analysis - White Sample

Mean spelling achievement scores for a sample of 438 fourth grade white pupils are shown in Table XV. Table XVI presents a summary of the analysis of variance data based on these scores. The mean spelling scores for the above average, average, and below average readiness levels were 55.1, 51.3, 48.8, respectively. These differences were significant at the .01 level of confidence. A significant sex difference ($p < .01$) was found. Mean spelling scores for girls and boys were 53.3 and 50.1, respectively. Differences related to CA were not significant, and there were no significant interactions.

Spelling Analysis - Total Sample

The mean spelling scores for the total sample of 1110 fourth grade children are presented in Table XVII. Table XVIII gives a summary of the analysis of variance data. Significant differences at the .01 level of confidence were found for three out of the four main effects. Only CA differences were non-significant. Mean spelling scores for the above average, average, and below average readiness levels were 53.7, 50.7, and 47.7, respectively. The mean spelling score for boys was 49.4 and the mean spelling score for girls was 52.0. Race differences were in favor of white pupils ($p < .01$). Mean spelling scores for Negro and white pupils were 49.7 and 51.7, respectively. No significant interactions were found.

TABLE XV

MEAN SPELLING SCORES OF 438 FOURTH GRADE WHITE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

Chronological Age Group	Sex	Readiness Level Above Average	Readiness Level Average	Readiness Level Below Average	Total
I	M	54.3	51.6	49.0	51.6
	F	56.4	52.6	49.5	52.8
	Total	55.4	52.1	49.2	52.2
II	M	52.9	48.4	48.1	49.8
	F	55.7	52.2	52.9	53.6
	Total	54.3	50.3	50.5	51.7
III	M	53.6	48.4	49.4	50.4
	F	55.3	55.3	47.1	52.5
	Total	54.4	51.8	48.2	51.5
IV	M	52.4	48.1	45.6	48.7
	F	60.6	53.5	48.8	54.3
	Total	56.5	50.8	47.2	51.5
Total	M	53.3	49.1	48.0	50.1
	F	57.0	53.4	49.6	53.3
	Total	55.1	51.3	48.8	51.7*

* Overall mean

TABLE XVI

ANALYSIS OF VARIANCE FOR SPELLING SCORES OF 438 FOURTH GRADE WHITE CHILDREN

Source	df	MS	F
Age (A)	3	.71	.16
Readiness (B)	2	81.79	18.49**
Sex (C)	1	60.24	13.62**
Age x Readiness (AB)	6	3.42	.77
Age x Sex (AC)	3	5.75	1.30
Readiness x Sex (BC)	2	4.14	.94
Age x Readiness x Sex (ABC)	6	3.41	.77
Within Error	414	4.42	

** Significant at the .01 level of confidence

TABLE XVII

MEAN SPELLING SCORES OF 1110 FOURTH GRADE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, SEX AND RACE

		Readiness Level											
		Above Average			Average			Below Average			Totals		
Chronological Age Group	Sex	Negro	White	Total	Negro	White	Total	Negro	White	Total	Negro	White	Total
I	M	53.1	54.3	53.7	48.0	51.6	49.8	45.7	49.0	47.3	48.9	50.6	50.3
		55.9	56.4	56.2	54.2	52.6	53.4	49.5	49.5	49.5	53.2	52.8	53.0
	Total	54.5	55.4	54.9	51.1	52.1	51.6	47.6	49.2	48.4	51.1	52.2	51.6
II	M	50.6	52.9	51.8	49.7	48.4	49.1	44.2	48.1	46.2	48.2	49.8	49.0
	F	53.5	55.7	54.6	48.8	52.2	50.5	46.7	52.9	49.8	49.6	53.6	51.6
	Total	52.1	54.3	53.2	49.3	50.3	49.8	45.5	50.5	48.0	48.9	51.7	50.3
III	M	55.2	53.6	54.4	49.1	48.4	48.7	47.8	49.4	48.6	50.7	50.4	50.6
	F	52.0	55.3	53.6	50.5	55.3	52.9	47.2	47.1	47.2	49.9	52.5	51.2
	Total	53.6	54.4	54.0	49.8	51.8	50.8	47.5	48.2	47.9	50.3	51.5	50.9
IV	M	46.4	52.4	49.4	48.5	48.1	48.3	45.4	45.6	45.5	46.8	48.7	47.7
	F	52.1	60.6	56.3	52.8	53.5	53.2	45.9	48.8	47.4	50.3	54.3	52.3
	Total	49.2	56.5	52.9	50.7	50.8	50.7	45.6	47.2	46.4	48.5	51.5	50.0
Total	M	51.3	53.3	52.3	48.8	49.1	49.0	45.8	48.0	46.9	48.6	50.1	49.4
	F	53.4	57.0	55.2	51.6	53.4	52.5	47.4	49.6	48.5	50.8	53.3	52.0
	Total	52.3	55.1	53.7	50.2	51.3	50.7	46.6	48.8	47.7	49.7	51.7	50.1*

* Overall mean

TABLE XVIII

ANALYSIS OF VARIANCE FOR SPELLING SCORES OF 1110 FOURTH GRADE CHILDREN

Source	df	MS	F
Age (A)	3	6.27	1.38
Readiness (B)	2	147.14	32.40**
Sex (C)	1	83.67	18.42**
Race (D)	1	49.47	10.89**
Age x Readiness (AB)	6	1.21	.27
Age x Sex (AC)	3	7.66	1.69
Age x Race (AD)	3	2.95	.65
Readiness x Sex (BC)	2	3.88	.86
Readiness x Race (BD)	2	3.18	.70
Sex x Race (CD)	1	3.36	.74
Age x Readiness x Sex (ABC)	6	4.53	1.00
Age x Readiness x Race (ABD)	6	5.33	1.17
Age x Sex x Race (ACD)	3	5.88	1.29
Readiness x Sex x Race (BCD)	2	.91	.20
Age x Readiness x Sex x Race (ABCD)	6	2.00	.44
Within Error	1062	4.54	

* Significant at the .05 level of confidence

** Significant at the .01 level of confidence

Analyses of Arithmetic Scores

Arithmetic Analysis - Negro Sample

Mean arithmetic achievement scores for 672 fourth grade Negro pupils are shown in Table XIX. Table XX presents analysis of variance data based on arithmetic scores. Mean arithmetic scores for the above average, average, and below average levels of readiness were 46.9, 43.2, and 39.2, respectively. These differences were significant at the .01 level of confidence. Differences related to CA and sex were not significant, and there were no significant interactions.

Arithmetic Analysis - White Sample

Table XXI shows the mean arithmetic scores for 438 white pupils, and Table XXII presents a summary of the analysis of variance data for these scores. The only significant main effect was readiness level ($p < .01$). Mean arithmetic scores for the above average, average, and below average readiness levels were 53.9, 48.9, and 45.7, respectively. No interactions were significant.

Arithmetic Analysis - Total Sample

Mean arithmetic achievement scores for the total sample of 1110 fourth grade pupils are found in Table XXIII. Table XXIV reports the analysis of variance summary based on these scores. Two main effects were significant at the .01 level of confidence. These were readiness and race. Mean arithmetic scores for the above average, average, and below average levels of readiness were 50.4, 46.0, and 42.4, respectively.

TABLE XIX

MEAN ARITHMETIC SCORES OF 672 FOURTH GRADE NEGRO CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

		Readiness Level			
Chronological Age Group	Sex	Above Average	Average	Below Average	Total
I	M	46.9	43.7	38.7	43.1
	F	51.0	45.6	40.3	45.6
	Total	49.0	44.6	39.5	44.4
II	M	43.7	42.6	41.1	42.5
	F	45.8	43.6	39.7	43.1
	Total	44.8	43.1	40.4	42.8
III	M	48.6	43.9	38.1	43.6
	F	47.6	43.8	37.5	43.0
	Total	48.1	43.9	37.8	43.3
IV	M	42.8	41.2	39.6	41.2
	F	48.8	40.9	38.5	42.7
	Total	45.8	41.0	39.1	42.0
Total	M	45.5	42.8	39.4	42.6
	F	48.3	43.5	39.0	43.6
	Total	46.9	43.2	39.2	42.1*

* Overall mean

TABLE XX

ANALYSIS OF VARIANCE FOR ARITHMETIC SCORES OF 672 FOURTH GRADE NEGRO CHILDREN

Source	df	MS	F
Age (A)	3	6.0	1.97
Readiness (B)	2	119.11	39.12**
Sex (C)	1	6.36	2.09
Age x Readiness (AB)	6	4.38	1.44
Age x Sex (AC)	3	2.71	.89
Readiness x Sex (BC)	2	5.29	1.74
Age x Readiness x Sex (ABC)	6	1.67	.55
Within Error	648	3.04	

** Significant at .01 level of confidence

TABLE XXI

MEAN ARITHMETIC SCORES OF 438 FOURTH GRADE WHITE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

Chronological Age Group	Sex	Readiness Level Above Average	Average	Below Average	Total
I	M	56.4	48.3	44.1	49.6
	F	53.9	51.3	44.1	49.8
	Total	55.1	49.8	44.1	49.7
II	M	57.9	47.9	47.1	51.0
	F	54.7	47.4	48.3	50.1
	Total	56.3	47.6	47.7	50.6
III	M	52.9	48.6	46.1	49.2
	F	52.0	48.3	43.8	48.0
	Total	52.4	48.4	44.9	48.6
IV	M	51.3	48.3	44.8	48.1
	F	52.3	50.9	47.1	50.1
	Total	51.8	49.6	45.9	49.1
Total	M	54.6	48.3	45.5	49.5
	F	53.2	49.4	45.8	49.5
	Total	53.9	48.9	45.7	49.7*

* Overall mean

TABLE XXII

ANALYSIS OF VARIANCE FOR ARITHMETIC SCORES OF 438 FOURTH GRADE WHITE CHILDREN

Source	df	MS	F
Age (A)	3	4.21	1.22
Readiness (B)	2	138.79	40.34**
Sex (C)	1	.01	
Age x Readiness (AB)	6	5.97	1.74
Age x Sex (AC)	3	3.11	.91
Readiness x Sex (BC)	2	3.40	.99
Age x Readiness x Sex (ABC)	6	1.16	.34
Within Error	414	3.44	

* Significant at the .01 level of confidence

TABLE XXIII

MEAN ARITHMETIC SCORES OF 1110 FOURTH GRADE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, SEX AND RACE

		Readiness Level											
		Above Average			Average			Below Average			Totals		
Chronological Age Group	Sex	Negro	White	Total	Negro	White	Total	Negro	White	Total	Negro	White	Total
I	M	46.9	56.4	51.6	43.7	48.3	46.0	38.7	44.1	41.4	43.1	49.6	46.3
	F	51.0	53.9	52.5	45.6	51.3	48.4	40.3	44.1	42.2	45.6	49.8	47.7
	Total	50.1	54.6	52.0	46.9	49.3	47.2	42.6	46.0	41.8	44.4	49.7	47.0
II	M	43.7	57.9	50.8	42.6	47.9	45.2	41.1	47.1	44.1	42.5	51.0	46.7
	F	45.8	54.7	50.3	43.6	47.4	45.5	39.7	48.3	44.0	43.1	50.1	46.6
	Total	47.7	53.1	50.5	44.6	50.2	45.4	42.2	46.0	44.1	42.8	50.6	46.7
III	M	48.6	52.9	50.8	43.9	48.6	46.3	38.1	46.1	42.1	43.6	49.2	46.4
	F	47.6	52.0	49.8	43.8	48.3	46.0	37.5	43.8	40.7	43.0	48.0	45.5
	Total	49.8	55.5	52.6	45.0	49.6	47.3	42.3	45.2	43.8	43.3	48.6	45.9
IV	M	42.8	51.3	47.0	41.2	48.3	44.7	39.6	44.8	42.2	41.2	48.1	44.6
	F	48.8	52.3	50.6	40.9	50.9	45.9	38.5	47.1	42.8	42.7	50.1	46.4
	Total	46.2	56.0	51.1	45.1	48.8	47.0	42.1	44.1	43.1	42.0	49.1	45.5
Total	M	45.5	54.6	50.1	42.8	48.3	45.5	39.4	45.5	42.5	42.6	49.5	46.0
	F	48.3	53.2	50.8	43.5	49.4	46.5	39.0	45.8	42.4	43.6	49.5	46.5
	Total	46.9	53.9	50.4	43.2	48.9	46.0	39.2	45.7	42.4	43.1	49.5	45.1*

* Overall mean

TABLE XXIV

ANALYSIS OF VARIANCE FOR ARITHMETIC SCORES OF 1110 FOURTH GRADE CHILDREN

Source	df	MS	F
Age (A)	3	5.41	1.60
Readiness (B)	2	256.12	75.62**
Sex (C)	1	3.40	1.01
Race (D)	1	490.25	144.74**
Age x Readiness (AB)	6	5.16	1.52
Age x Sex (AC)	3	4.71	1.39
Age x Race (AD)	3	4.79	1.42
Readiness x Sex (BC)	2	1.00	.30
Readiness x Race (BD)	2	1.78	.53
Sex x Race (CD)	1	2.96	.88
Age x Readiness x Sex (ABC)	6	.96	.28
Age x Readiness x Race (ABD)	6	5.19	1.53
Age x Sex x Race (ACD)	3	1.12	.33
Readiness x Sex x Race (BCD)	2	7.68	2.27
Age x Readiness x Sex x Race (ABCD)	6	1.87	.55
Within Error	1062	3.39	

* Significant at the .05 level of confidence

** Significant at the .01 level of confidence

The mean arithmetic score for Negro pupils was 43.1 and the mean arithmetic score for white pupils was 49.5. No significant interactions were indicated.

Analyses of Personal Adjustment Scores

Personal Adjustment Analysis - Negro Sample

The data in Table XXV and Table XXVI give results of the analyses of personal adjustment scores of 672 fourth grade Negro pupils. Mean personal adjustment scores for the above average, average, and below average readiness levels were 45.1, 42.3, and 41.7, respectively. Differences across levels of readiness were significant at the .01 level of confidence. Differences related to CA and sex were not significant, and there were no significant interactions.

Personal Adjustment Analysis - White Sample

Data relative to the personal adjustment scores of 438 fourth grade white children are summarized in Table XXVII and Table XXVIII. Above average readiness pupils had significantly ($p < .01$) higher scores than the average or below average pupils. Mean personal adjustment scores for the above average, average, and below average readiness levels were 46.4, 41.8, and 40.2, respectively. The main effects of CA and sex were not significant, and there were no significant interactions.

Personal Adjustment Analysis - Total Sample

Table XXIX and Table XXX present summary results of the analysis of personal adjustment scores of the total sample of 1110 fourth grade

TABLE XXV

MEAN PERSONAL ADJUSTMENT SCORES OF 672 FOURTH GRADE NEGRO CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

Chronological Age Group	Sex	Readiness Level Above Average	Average	Below Average	Total
I	M	47.5	43.8	41.2	44.2
	F	44.5	41.6	40.9	42.3
	Total	46.0	42.7	41.0	43.3
II	M	47.5	45.5	43.3	45.4
	F	42.7	39.9	43.1	41.9
	Total	45.1	42.7	43.2	43.7
III	M	44.5	42.3	41.2	42.6
	F	47.3	41.6	42.1	43.7
	Total	45.9	41.9	41.6	43.2
IV	M	44.5	43.9	39.3	42.6
	F	42.2	39.4	42.5	41.4
	Total	43.4	41.7	40.9	42.0
Total	M	46.0	43.9	41.2	43.7
	F	44.2	40.6	42.2	42.3
	Total	45.1	42.3	41.7	42.6*

* Overall mean

TABLE XXVI

ANALYSIS OF VARIANCE FOR PERSONAL ADJUSTMENT SCORES OF 672 FOURTH GRADE NEGRO CHILDREN

Source	df	MS	F
Age (A)	3	3.07	.74
Readiness (B)	2	26.59	6.37**
Sex (C)	1	11.50	2.76
Age x Readiness (AB)	6	1.34	.32
Age x Sex (AC)	3	5.34	1.28
Readiness x Sex (BC)	2	9.12	2.19
Age x Readiness x Sex (ABC)	6	1.87	.45
Within Error	648	4.17	

** Significant at the .01 level of confidence

TABLE XXVII

MEAN PERSONAL ADJUSTMENT SCORES OF 438 FOURTH GRADE WHITE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

Chronological Age Group	Sex	Readiness Level			Total
		Above Average	Average	Below Average	
I	M	45.7	42.9	38.8	42.5
	F	49.2	42.1	39.2	43.5
	Total	47.5	42.5	39.0	43.0
II	M	47.0	41.9	42.6	43.9
	F	42.6	41.8	44.1	42.8
	Total	44.8	41.9	43.4	43.3
III	M	42.5	40.7	39.4	40.9
	F	48.3	43.1	36.1	42.5
	Total	45.4	41.9	37.7	41.7
IV	M	45.4	39.4	37.4	40.7
	F	50.1	42.3	43.8	45.4
	Total	47.7	40.8	40.6	43.1
Total	M	45.1	41.3	39.5	42.0
	F	47.6	42.3	40.8	43.6
	Total	46.4	41.8	40.2	42.8*

* Overall mean

TABLE XXVIII

ANALYSIS OF VARIANCE FOR PERSONAL ADJUSTMENT SCORES OF 438 FOURTH GRADE WHITE CHILDREN

Source	df	MS	F
Age (A)	3	3.31	.45
Readiness (B)	2	82.28	11.08**
Sex (C)	1	15.00	2.02
Age x Readiness (AB)	6	6.91	.93
Age x Sex (AC)	3	8.41	1.13
Readiness x Sex (BC)	2	1.08	.15
Age x Readiness x Sex (ABC)	6	6.07	.82
Within Error	414	7.42	

** Significant at the .01 level of confidence

TABLE XXIX

MEAN PERSONAL ADJUSTMENT SCORES OF 1110 FOURTH GRADE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, SEX AND RACE

		Readiness Level											
		Above Average			Average			Below Average			Totals		
Chronological Age Group	Sex	Negro	White	Total	Negro	White	Total	Negro	White	Total	Negro	White	Total
I	M	47.5	45.7	46.6	43.8	42.9	43.4	41.2	38.8	40.0	44.2	42.5	43.3
	F	44.5	49.2	46.9	41.6	42.1	41.8	40.9	39.2	40.1	42.3	43.5	42.9
	Total	46.0	47.5	46.8	42.7	42.5	42.6	41.0	39.0	40.0	43.3	43.0	43.1
II	M	47.5	47.0	47.2	45.5	41.9	43.7	43.3	42.6	43.0	45.4	43.9	44.6
	F	42.7	42.6	42.6	39.9	41.8	40.8	43.1	44.1	43.6	41.9	42.8	42.4
	Total	45.1	44.8	44.9	42.7	41.9	42.3	43.2	43.4	43.3	43.7	43.3	43.5
III	M	44.5	42.5	43.5	42.3	40.7	41.5	41.2	39.4	40.3	42.6	40.9	41.7
	F	47.3	48.3	47.8	41.6	43.1	42.3	42.1	36.1	39.1	43.7	42.5	43.1
	Total	45.9	45.4	45.7	41.9	41.9	41.9	41.6	37.7	39.7	43.2	41.7	42.4
IV	M	44.5	45.4	45.0	43.9	39.4	41.7	39.3	37.4	38.3	42.6	40.7	41.7
	F	42.2	50.1	46.2	39.4	42.3	40.9	42.5	43.8	43.2	41.4	45.4	43.4
	Total	43.4	47.7	45.6	41.7	40.8	41.3	40.9	40.6	40.8	42.0	43.1	42.5
Total	M	46.0	45.1	45.6	43.9	41.3	42.6	41.2	39.5	40.4	43.7	42.0	42.8
	F	44.2	47.6	45.9	40.6	42.3	41.5	42.2	40.8	41.5	42.3	43.6	42.9
	Total	45.1	46.4	45.7	42.3	41.8	42.0	41.7	40.2	40.9	43.0	42.8	42.7*

* Overall mean

TABLE XXX

ANALYSIS OF VARIANCE FOR PERSONAL ADJUSTMENT SCORES OF 1110 FOURTH GRADE CHILDREN

Source	df	MS	F
Age (A)	3	3.13	.57
Readiness (B)	2	100.97	18.22**
Sex (C)	1	.11	.02
Race (D)	1	.77	.14
Age x Readiness (AB)	6	5.55	1.00
Age x Sex (AC)	3	10.13	1.83
Age x Race (AD)	3	3.25	.59
Readiness x Sex (BC)	2	4.99	.90
Readiness x Race (BD)	2	7.91	1.43
Sex x Race (CD)	1	26.40	4.76*
Age x Readiness x Sex (ABC)	6	6.37	1.15
Age x Readiness x Race (ABD)	6	2.70	.49
Age x Sex x Race (ACD)	3	3.62	.65
Readiness x Sex x Race (BCD)	2	5.20	.94
Age x Readiness x Sex x Race (ABCD)	6	1.58	.28
Within Error	1062	5.54	

* Significant at the .05 level of confidence

** Significant at the .01 level of confidence

pupils. Differences among levels of readiness were significant at the .01 level of confidence. No significant differences were found for main effects of CA, sex, and race. A significant ($p < .05$) interaction between sex and race was found. The sex by race interaction resulted from the fact that Negro males had a higher mean personal adjustment score (43.7) than Negro females (42.3) whereas the opposite was true for white pupils. The mean personal adjustment score for white boys was 42.1 and the mean personal adjustment score for white girls was 43.6.

Analyses of Social Adjustment Scores

Social Adjustment Analysis - Negro Sample

Mean social adjustment scores for a sample of 672 fourth grade Negro children are contained in Table XXXI. Table XXXII presents a summary of the analysis of variance for social adjustment. Mean social adjustment scores for boys and girls differed significantly ($p < .01$). The mean score for girls was 52.1 and the mean score for boys was 49.9. Differences among CA groups and levels of readiness were not significant, and there were no significant interactions.

Social Adjustment Analysis - White Sample

The mean social adjustment scores for a sample of 438 fourth grade white pupils are given in Table XXXIII. Table XXXIV presents the analysis of variance summary. The mean social adjustment score for girls was 52.8, and the mean social adjustment score for boys was 48.5, a significant difference at the .01 level of confidence. The

TABLE XXXI

MEAN SOCIAL ADJUSTMENT SCORES OF 672 FOURTH GRADE NEGRO CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

		Readiness Level			
Chronological Age Group	Sex	Above Average	Average	Below Average	Total
I	M	54.1	50.4	48.8	51.1
	F	53.0	51.4	51.7	52.0
	Total	53.5	50.9	50.2	51.6
II	M	51.6	51.7	50.8	51.4
	F	50.4	50.3	51.6	50.8
	Total	51.0	51.0	51.2	51.1
III	M	48.4	48.9	48.0	48.5
	F	55.8	52.5	51.3	53.2
	Total	52.1	50.7	49.7	50.8
IV	M	48.6	49.2	48.6	48.8
	F	54.5	51.0	51.9	52.5
	Total	51.6	50.1	50.3	50.6
Total	M	50.7	50.0	49.1	49.9
	F	53.4	51.3	51.6	52.1
	Total	52.1	50.7	50.3	51.0*

* Overall mean

TABLE XXXII

ANALYSIS OF VARIANCE FOR SOCIAL ADJUSTMENT SCORES OF 672 FOURTH GRADE NEGRO CHILDREN

Source	df	MS	F
Age (A)	3	.93	.25
Readiness (B)	2	6.61	1.81
Sex (C)	1	28.71	7.86**
Age x Readiness (AB)	6	1.28	.35
Age x Sex (AC)	3	8.92	2.44
Readiness x Sex (BC)	2	1.31	.36
Age x Readiness x Sex (ABC)	6	2.09	.57
Within Error	648	3.65	

** Significant at the .01 level of confidence

TABLE XXXIII

MEAN SOCIAL ADJUSTMENT SCORES OF 438 FOURTH GRADE WHITE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

		Readiness Level			
Chronological Age Group	Sex	Above Average	Average	Below Average	Total
I	M	49.5	45.3	45.8	46.9
	F	56.6	50.5	50.3	52.5
	Total	53.1	47.9	48.0	49.7
II	M	50.4	50.7	54.2	51.8
	F	53.7	52.9	52.5	53.1
	Total	52.0	51.8	53.4	52.4
III	M	44.7	47.5	47.6	46.6
	F	53.6	51.8	47.1	50.8
	Total	49.2	49.7	47.3	48.7
IV	M	51.4	45.6	49.8	48.9
	F	55.0	52.2	57.8	55.0
	Total	53.2	48.9	53.8	52.0
Total	M	49.0	47.3	49.3	48.5
	F	54.7	51.9	51.9	52.8
	Total	51.9	49.6	50.6	50.7*

* Overall mean

TABLE XXXIV

ANALYSIS OF VARIANCE FOR SOCIAL ADJUSTMENT SCORES OF 438 FOURTH GRADE WHITE CHILDREN

Source	df	MS	F
Age (A)	3	18.89	2.29
Readiness (B)	2	10.46	1.27
Sex (C)	1	110.87	13.42**
Age x Readiness (AB)	6	8.59	1.04
Age x Sex (AC)	3	6.93	.84
Readiness x Sex (BC)	2	5.01	.61
Age x Readiness x Sex (ABC)	6	4.28	.52
Within Error	414	8.26	

** Significant at the .01 level of confidence

main effects of CA and readiness level were not significant, and there were no significant interactions.

Social Adjustment Analysis - Total Sample

The mean social adjustment scores of the Total sample of 1110 fourth grade pupils are summarized in Table XXXV. The analysis of variance (Table XXXVI) indicated a significant ($p < .01$) sex difference in mean social adjustment scores. Mean scores for girls and boys were 52.5 and 49.2, respectively. CA, readiness level, and race were not significant sources of variation, and there were no significant interactions.

Analyses of Total Adjustment Scores

Total Adjustment Analysis - Negro Sample

Table XXXVII shows the mean total adjustment scores for a sample of 672 fourth grade Negro pupils. Table XXXVIII indicated that significant differences ($p < .05$) among levels of readiness were found. Above average readiness pupils scored significantly higher than average and below average readiness pupils. Mean total adjustment scores for above average, average, and below average levels of readiness were 96.8, 92.9, and 92.0, respectively. Age and sex differences were not significant. An age by sex interaction, however, was significant ($p < .05$). This was associated with the fact that boys attained higher scores than girls in CA groups I and II and girls attained higher scores than boys in CA groups III and IV.

TABLE XXXV

MEAN SOCIAL ADJUSTMENT SCORES OF 1110 FOURTH GRADE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, SEX AND RACE

		Readiness Level											
		Above Average			Average			Below Average			Totals		
Chronological Age Group	Sex	Negro	White	Total	Negro	White	Total	Negro	White	Total	Negro	White	Total
I	M	54.1	49.5	51.8	50.4	45.3	47.9	48.8	45.8	47.3	51.1	46.9	49.0
	F	53.0	56.6	54.8	51.4	50.5	51.0	51.7	50.3	51.0	52.0	52.5	52.2
	Total	53.5	53.1	53.3	50.9	47.9	49.4	50.2	48.0	49.1	51.6	49.7	50.6
II	M	51.6	50.4	51.0	51.7	50.7	51.2	50.8	54.2	52.5	51.4	51.8	51.6
	F	50.4	53.7	52.0	50.3	52.9	51.6	51.6	52.5	52.1	50.8	53.1	51.9
	Total	51.0	52.0	51.5	51.0	51.8	51.4	51.2	53.4	52.3	51.1	52.4	51.7
III	M	48.4	44.7	46.6	48.9	47.5	48.2	48.0	47.6	47.8	48.5	46.6	47.5
	F	55.8	53.6	54.7	52.5	51.8	52.2	51.3	47.1	49.2	53.2	50.8	52.0
	Total	52.1	49.2	50.6	50.7	49.7	50.2	49.7	47.3	48.5	50.8	48.7	49.8
IV	M	48.6	51.4	50.0	49.2	45.6	47.4	48.6	49.8	49.2	48.8	48.9	48.9
	F	54.5	55.0	54.8	51.0	52.2	51.6	51.9	57.8	54.9	52.5	55.0	53.7
	Total	51.6	53.2	52.4	50.1	48.9	49.5	50.3	53.8	52.0	50.6	52.0	51.3
Total	M	50.7	49.0	49.8	50.0	47.3	48.7	49.1	49.3	49.2	49.9	48.5	49.2
	F	53.4	54.7	54.1	51.3	51.9	51.6	51.6	51.9	51.8	52.1	52.8	52.5
	Total	52.1	51.9	52.0	50.7	49.6	50.1	50.3	50.6	50.5	51.0	50.7	**50.9***

* Overall mean

TABLE XXXVI

ANALYSIS OF VARIANCE FOR SOCIAL ADJUSTMENT SCORES OF 1110 FOURTH GRADE CHILDREN

Source	df	MS	F
Age (A)	3	8.83	1.62
Readiness (B)	2	15.09	2.77
Sex (C)	1	126.21	23.20**
Race (D)	1	1.34	.25
Age x Readiness (AB)	6	7.56	1.39
Age x Sex (AC)	3	12.51	2.30
Age x Race (AD)	3	10.98	2.02
Readiness x Sex (BC)	2	3.07	.57
Readiness x Race (BD)	2	1.98	.36
Sex x Race (CD)	1	13.38	2.46
Age x Readiness x Sex (ABC)	6	3.28	.60
Age x Readiness x Race (ABD)	6	2.31	.43
Age x Sex x Race (ACD)	3	3.33	.61
Readiness x Sex x Race (BCD)	2	3.24	.60
Age x Readiness x Sex x Race (ABCD)	6	3.09	.57
Within Error	1062	5.44	

** Significant at the .01 level of confidence

TABLE XXXVII

MEAN TOTAL ADJUSTMENT SCORES OF 672 FOURTH GRADE NEGRO CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

Chronological Age Group	Sex	Readiness Level Above Average	Average	Below Average	Total
I	M	101.0	94.2	90.3	95.2
	F	96.6	92.2	91.8	93.5
	Total	98.8	93.2	91.1	94.3
II	M	99.1	97.5	94.4	97.0
	F	92.5	90.4	94.4	92.4
	Total	95.8	93.9	94.4	94.7
III	M	91.8	91.3	89.7	90.9
	F	103.7	94.4	93.0	97.0
	Total	97.7	92.8	91.4	94.0
IV	M	93.6	92.7	87.7	91.4
	F	96.3	91.0	94.3	93.9
	Total	95.0	91.8	91.0	92.6
Total	M	96.4	93.9	90.5	93.6
	F	97.3	92.0	93.4	94.2
	Total	96.8	92.9	92.0	93.5*

* Overall mean

TABLE XXXVIII

ANALYSIS OF VARIANCE FOR TOTAL ADJUSTMENT SCORES OF 672 FOURTH GRADE NEGRO CHILDREN

Source	df	MS	F
Age (A)	3	5.04	.41
Readiness (B)	2	52.47	4.25*
Sex (C)	1	2.24	.18
Age x Readiness (AB)	6	4.01	.33
Age x Sex (AC)	3	32.72	2.65*
Readiness x Sex (BC)	2	11.66	.95
Age x Readiness x Sex (ABC)	6	7.25	.59
Within Error	648	12.34	

* Significant at the .05 level of confidence

Total Adjustment Analysis - White Sample

Mean scores for total adjustment are shown in Table XXXIX for a sample of 438 fourth grade white pupils. The analysis of variance (Table XL) indicated a significant sex difference ($p < .05$). Mean total adjustment scores for girls and boys were 96.5 and 91.1, respectively. All other sources of variation were non-significant.

Total Adjustment Analysis - Total Sample

The mean total adjustment scores for the total sample of 1110 fourth grade pupils are shown in Table XLI. Significant sources of variation as shown in Table XLII were readiness level ($p < .01$), sex ($p < .05$), age by sex interaction ($p < .01$), and sex by race interaction ($p < .05$). Mean scores for the above average, average, and below average levels of readiness were 97.6, 92.4, and 91.6, respectively, in which the latter two scores were significantly lower than the first. Girls reflected higher scores than boys with a mean total adjustment score of 95.4 as compared with a mean total adjustment score of 92.4. An age by sex interaction occurred as a result of proportionately higher scores for girls than for boys in CA groups III and IV as compared with CA groups I and II. In fact, boys scored slightly above girls in CA group II. The sex by race interaction was related to the fact that the sex difference in total adjustment was negligible for Negro pupils, but there was a significant difference in total adjustment scores between white females and white males.

TABLE XXXIX

MEAN TOTAL ADJUSTMENT SCORES OF 438 FOURTH GRADE WHITE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, AND SEX

		Readiness Level			
Chronological Age Group	Sex	Above Average	Average	Below Average	Total
I	M	96.6	92.7	87.3	92.2
	F	105.4	94.9	89.1	96.4
	Total	101.0	93.8	88.2	94.3
II	M	98.3	94.2	97.8	96.8
	F	97.7	93.5	95.3	95.5
	Total	98.0	93.9	96.5	96.1
III	M	85.5	87.8	87.6	87.0
	F	101.3	95.2	84.4	93.6
	Total	93.4	91.5	86.0	90.3
IV	M	97.8	81.3	86.6	88.6
	F	104.8	94.8	101.9	100.5
	Total	101.3	88.0	94.2	94.5
Total	M	94.6	89.0	89.8	91.1
	F	102.3	94.6	92.6	96.5
	Total	98.4	91.8	91.2	94.0*

* Overall mean

TABLE XL

ANALYSIS OF VARIANCE FOR TOTAL ADJUSTMENT SCORES OF 438 FOURTH GRADE WHITE CHILDREN

Source	df	MS	F
Age (A)	3	36.93	1.54
Readiness (B)	2	127.97	5.35
Sex (C)	1	173.53	7.25*
Age x Readiness (AB)	6	26.99	1.13
Age x Sex (AC)	3	44.87	1.88
Readiness x Sex (BC)	2	12.15	.51
Age x Readiness x Sex (ABC)	6	17.03	.71
Within Error	414	23.92	

* Significant at the .05 level of confidence

TABLE XLI

MEAN TOTAL ADJUSTMENT SCORES OF 1110 FOURTH GRADE CHILDREN BY READINESS LEVEL, CHRONOLOGICAL AGE, SEX AND RACE

		Readiness Level											
		Above Average			Average			Below Average			Totals		
Chronological Age Group	Sex	Negro	White	Total	Negro	White	Total	Negro	White	Total	Negro	White	Total
I	M	101.0	96.6	98.8	94.2	92.7	93.4	90.3	87.3	88.8	95.2	92.2	93.7
	F	96.6	105.4	101.0	92.2	94.9	93.5	91.8	89.1	90.5	93.5	96.4	95.0
	Total	98.8	101.0	99.9	93.2	93.8	93.5	91.1	88.2	89.6	94.3	94.3	94.3
II	M	99.1	98.3	98.7	97.5	94.2	95.8	94.4	97.8	96.1	97.0	96.8	96.9
	F	92.5	97.7	95.1	90.4	93.5	92.0	94.4	95.3	94.9	92.4	95.5	94.0
	Total	95.8	98.0	96.9	93.9	93.9	93.9	94.4	96.5	95.5	94.7	96.1	95.4
III	M	91.8	85.5	88.7	91.3	87.8	89.5	89.7	87.6	88.7	90.9	87.0	89.0
	F	103.7	101.3	102.5	94.4	95.2	94.8	93.0	84.4	88.7	97.0	93.6	95.3
	Total	97.7	93.4	95.6	92.8	91.5	92.2	91.4	86.0	88.7	94.0	90.3	92.1
IV	M	93.6	97.8	95.7	92.7	81.3	87.0	87.7	86.6	87.2	91.4	88.6	90.0
	F	96.3	104.8	100.5	91.0	94.8	92.9	94.3	101.9	98.1	93.9	100.5	97.2
	Total	95.0	101.3	98.1	91.8	88.0	89.9	91.0	94.2	92.6	92.6	94.5	93.6
Total	M	96.4	94.6	95.5	93.9	89.0	91.4	90.5	89.8	90.2	93.6	91.1	92.4
	F	97.3	102.3	99.8	92.0	94.6	93.3	93.4	92.6	93.0	94.2	96.5	95.4
	Total	96.8	98.4	97.6	92.9	91.8	92.4	92.0	91.2	91.6	93.9	93.8	93.7*

* Overall mean

TABLE XLII

ANALYSIS OF VARIANCE FOR TOTAL ADJUSTMENT SCORES OF 1110 FOURTH GRADE CHILDREN

Source	df	MS	F
Age (A)	3	22.90	1.34
Readiness (B)	2	171.54	10.06**
Sex (C)	1	107.65	6.32*
Race (D)	1	.09	.01
Age x Readiness (AB)	6	20.70	1.21
Age x Sex (AC)	3	66.78	3.92**
Age x Race (AD)	3	19.08	1.12
Readiness x Sex (BC)	2	6.26	.37
Readiness x Race (BD)	2	8.91	.52
Sex x Race (CD)	1	68.13	4.00*
Age x Readiness x Sex (ABC)	6	18.66	1.10
Age x Readiness x Race (ABD)	6	10.28	.60
Age x Sex x Race (ACD)	3	10.81	.63
Readiness x Sex x Race (BCD)	2	17.55	1.03
Age x Readiness x Sex x Race (ABCD)	6	5.61	.33
Within Error	1062	17.05	

* Significant at the .05 level of confidence

** Significant at the .01 level of confidence

Summary

The results of 18 factorial studies were presented in this chapter in which first grade entrance variables were studied in connection with fourth grade achievement and personality adjustment scores. The subjects for the study included 672 Negro pupils and 438 white pupils for a total sample of 1110 subjects, all of whom were selected from 39 schools which serve economically and culturally deprived neighborhoods.

The first grade entrance variables, including CA, measured readiness level, sex, and race, were used to classify pupils. Six dependent measures in achievement and personality adjustment were used to test the main effects of CA, readiness level, sex, and race. Dependent measures used were: reading, spelling, arithmetic, personal adjustment, social adjustment, and total adjustment.

As opposed to several previous research studies relating school entrance variables to achievement and adjustment, CA in this study was not an extremely important factor. CA was a significant main effect in only one out of 18 analyses. First grade readiness level was highly significant as a source of variation for nearly all dependent variables. The exceptions were the three social adjustment analyses and the total adjustment analysis of white pupils. For significant findings relative to sex differences girls consistently attained higher scores than boys. Significant sex differences were observed for five out of nine achievement analyses and five out of nine personality analyses. The major exceptions involved arithmetic and personal adjustment measures in which no significant sex differences were found. The usual race difference in achievement was found in which Negro pupils did not perform as well as white pupils. No race differences, however, were evidenced for personality measures.

Results found in this chapter fulfill the purpose of this study by contributing new findings specific to children from schools serving economically deprived neighborhoods.

CHAPTER V

SUMMARY AND CONCLUSIONS

The present research explored first grade entrance variables as they related to fourth grade achievement and personality adjustment of 1110 pupils from 39 schools which serve culturally deprived neighborhoods. There were 672 Negro pupils and 438 white pupils in the study. School entrance variables (main effects) included: chronological age (CA), readiness level, sex, and race. All subjects were born in the same calendar year (1956) and entered school in the fall of 1962. Fourth grade (1965-1966 school year) fall achievement test scores and spring personality test scores were analyzed by analysis of variance. Achievement areas were measured by the Metropolitan Achievement Test and included three basic areas; reading, spelling, and arithmetic computation. Personality adjustment scores were measured by the California Test of Personality and included three adjustment areas; personal adjustment, social adjustment, and total adjustment.

Subjects were classified into four chronological age (CA) groups depending upon the month of birth. CA group I included January, February, and March births. CA group II included April, May, and June births. CA group III included July, August, and September births. CA group IV included October, November, and December births.

Pupils also were classified into three levels of readiness based upon Metropolitan Readiness Test scores obtained in the first month of school after pupils entered the first grade. Levels of readiness were: above average, average, and below average. Sex and race were additional variables by which subjects were classified.

Employing the classification system described above, data from the six dependent measures (reading, spelling, arithmetic, personal adjustment, social adjustment, and total adjustment) were analyzed separately by using a 4 x 3 x 2 factorial design for the Negro and white samples, and a 4 x 3 x 2 x 2 factorial design for the total sample. The major findings (significant main effects) are shown in summary form in Table XLIII. Significant interactions also are summarized. Educational implications and need for further research conclude the study.

Summary of Results

The significant findings of this study are summarized below under the headings of Main Effects and Significant Interactions.

Main Effects

Chronological age. Table XLIII indicates the only situation in which there was a significant difference among age groups. Reading scores of CA groups of Negro pupils were significantly different. Mean reading scores favored CA groups of these students in the following order: CA I, CA III, CA II, and CA IV. The oldest pupils scored significantly over the youngest pupils ($p < .05$). No significant differences among CA groups were found in 17 of the 18 analyses.

Readiness level. Differences among readiness levels were significant in 14 out of 18 analyses (Table XLIII). A consistent pattern was found in which the following order, from highest to lowest was observed: above average, average, and below average. Significant

TABLE XLIII

SUMMARY TABLE OF SIGNIFICANT MAIN EFFECTS FOR EACH ANALYSIS OF VARIANCE SHOWING LEVEL OF CONFIDENCE

	Sources of Variation									
	Chronological Age[a]			Readiness Level[b]			Sex[c]			Race[d]
Dependent Measures	Negro	White	Total	Negro	White	Total	Negro	White	Total	Total
Reading	.05	N.S.	N.S.	.01	.01	.01	N.S.	.05	.01	.01
Spelling	N.S.	N.S.	N.S.	.01	.01	.01	.05	.01	.01	.01
Arithmetic	N.S.	N.S.	N.S.	.01	.01	.01	N.S.	N.S.	N.S.	.01
Personal Adjustment	N.S.	N.S.	N.S.	.01	.01	.01	N.S.	N.S.	N.S.	N.S.
Social Adjustment	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	.01	.01	.01	N.S.
Total Adjustment	N.S.	N.S.	N.S.	.01	N.S.	.01	N.S.	.05	.05	N.S.

[a] Mean scores for the one significant finding favored CA groups in the following order: CA I, CA III, CA II, and CA IV.

[b] For significant findings, mean scores consistently favored readiness levels in the following order: Above Average, Average, and Below Average.

[c] For significant findings, without exception girls were favored in comparison with boys.

[d] For all significant findings, White pupils were favored in comparison with Negro pupils.

differences were invariable at the .01 level of confidence. All analyses of variance of achievement scores were significant in showing difference among levels of readiness. Negro, white, and total analyses of personal adjustment scores as they related to readiness were significant. No significant differences among readiness levels were observed for social adjustment. Negro and total analyses regarding total adjustment were significant.

Sex. Significant sex differences were observed in 10 of the 18 analyses (Table XLIII). For significant findings girls scored higher than boys without exception. Results of significant sex differences were observed for the following: white and total reading analyses; all spelling analyses; all social adjustment analyses; and white and total, total adjustment analyses.

Race. Negro pupils did not perform as well as white pupils on measures of achievement (reading, spelling, and arithmetic). These differences were significant at the .01 level of confidence. No significant race differences were obtained for personality adjustment variables.

Significant Interactions

Analyses of reading scores for the total sample revealed the only significant interactions ($p < .05$) in the analyses of achievement areas. There was an inconsistent arrangement in which reading scores for girls were significantly higher than scores for boys in CA groups II and IV but not in CA groups I and III. This produced a significant CA by sex interaction for which no logical explanation could be supplied.

At the above average level of readiness a significant interaction ($p < .01$) between readiness level and race resulted from the fact that race differences were proportionately large as compared with race differences at lower levels of readiness. The variable differences described above resulted in a significant ($p < .05$) triple interaction between CA, readiness level, and sex.

Four significant two-factor interactions were found within the analyses of personality adjustment scores. A significant ($p < .05$) sex by race interaction was found for the total sample personal adjustment analysis. Negro boys scored higher than Negro girls and white girls scored higher than white boys which produced the interaction. The overall sex difference was nonsignificant. There were no significant interactions with respect to social adjustment analyses. Three two-factor interactions were observed in the total adjustment analyses. There was an interaction ($p < .05$) between CA and sex for the Negro analysis of total adjustment in which boys scored higher in CA groups I and II and girls scored higher in CA groups III and IV. The CA by sex interaction held true ($p < .01$) for the total sample analysis of total adjustment scores. A sex by race interaction also was found for the total adjustment analysis in which there was a greater sex difference for white children as compared with the Negro sex difference for Negro children. Girls scored higher, however, for both races.

Educational Implications and Suggestions for Further Research

Recent studies (Witty, 1967) of cultural deprivation related to educational practices are numerous. The findings of the present study have far-reaching educational implications for culturally deprived children. In the discussion of educational implications suggestions for further research are interwoven.

Admission Policies

Present Tennessee laws which govern first grade school entrance rely solely on a chronological age criterion. The law for the current school year (1966-67) required first grade entrants to be six years of age on or before November 30, 1966. The age six baseline for the fall of 1967 is October 31. Beginning in the fall of 1968 and for subsequent years, according to existing legislation, children entering the first grade must be six years of age on or before September 30.

In this study with culturally disadvantaged pupils CA group differences in achievement and personality adjustment were insignificant in 17 of 18 analyses. The older children were favored significantly ($p < .05$) in the one exception, the reading analysis of Negro children.

The weak relationship between first grade entrance age and subsequent achievement and adjustment lends support to providing more flexible school entrance policies. If educators and legislators insist on a strict age criterion for first grade entrance, however, educational provisions for individual differences should be given additional attention, especially for culturally disadvantaged children. Existing evidence does not support the use of CA alone in determination of initial and later school success and personality adjustment.

The need for multiple criteria for first grade entrance of culturally disadvantaged children is demonstrated by this study.

In terms of the variables explored, initial school readiness, as measured by the Metropolitan Readiness Test, was related most strongly to fourth grade achievement and adjustment. However, no combination of variables in this study could provide enough information for a decision regarding the school readiness of individual children. Therefore, no generalization should be made to the individual youngsters who are at the threshold of school entrance. This argues for idiographic studies which take into account a multiplicity of variables, including the first grade entrance variables used in this study and other variables necessary for a careful child study.

Preschool Testing

The use of idiographic studies is the natural alternative to the application of nomothetic findings (which are often used inappropriately as they are applied in decisions regarding individual children). In this study fourth grade achievement and adjustment were differentiated most sharply by levels of first grade readiness as compared with other independent variables, including CA, sex, and race. The main effects of readiness, being significantly ($p < .01$) related to later success in school, raise the possibility of an even more refined procedure whereby youngsters could be evaluated before first grade entrance. Evaluation results would provide school personnel with necessary pupil data to insure the "proper match" of pupils and curriculum content (Havighurst, et al., 1966, p. 36). A community-wide pre-school developmental testing program which may be designed similarly after the model of Ilg and Ames' (1965) developmental appraisal techniques in which children are administered individual readiness (developmental) tests by trained examiners would be useful.

Longitudinal Studies

In conjunction with pre-school testing, which has the immediate advantage of proper placement of children in educational settings, the developmental approach should be carried to its logical end. The need for longitudinal studies is implied. Longitudinal information would serve as a bank of valuable data both for research and for use in individualizing instruction. Extensive diagnostic information, readily accessible, should improve the effectiveness of local school personnel, pupil personnel services workers, curriculum consultants and researchers. The concept of the data bank embodies modern data processing whereby research and other uses of information are facilitated by rapid access and statistical treatment of data. Replications of the present study at various age and grade levels are suggested. These additional studies would be facilitated by the collection of longitudinal data.

Aspects of Personality Adjustment

Additional considerations and conclusions from this study regarding personality findings were explored. The results of all personality adjustment analyses revealed that chronological age was not a significant source of variation. An interpretation of this finding tends to minimize the age variable with respect to personality adjustment.

Every analysis of personal adjustment and two of three analyses of total adjustment revealed a linear trend in which above average readiness pupils had higher adjustment scores than average readiness pupils, and below average readiness pupils had the lowest adjustment ratings. This tends to support the idea that, for culturally deprived youngsters, a good start in school, as determined by readiness tests, has value in predicting later personal and total adjustment as measured by the CTP. Additional studies are needed to test these hypotheses. On the other hand readiness level was not a significant source of variation in the analysis of social adjustment. Speculation regarding this finding may result in testable hypotheses for future investigations.

Every analysis of social adjustment revealed that sex was a significant source of variation in which girls scored higher than boys ($p < .01$). Girls also excelled boys in two of three analyses of total adjustment ($p < .05$). No significant sex differences in personal adjustment were observed. Practical applications of these findings need further study.

The culturally and economically disadvantaged are characterized by negative self-images. This statement found support in the present study in which the mean total adjustment score received a percentile rank of 30. This one finding was typical of conclusions reached by many authorities of disadvantaged groups (Witty, 1967). For example, Passow and Elliott (1967, p. 25) affirm that, "The scholastic performance of many disadvantaged children suffers from their lower self-esteem, lower sense of personal worth, and lower aspiration level." The reversibility of self-debasement is extremely complex. A global approach has been to combine the resources of school, family, and community. This preferred approach is preventive as well as remedial, since pre-school treatments are prescribed as well as corrective programs at higher age levels.

Personality adjustment analyses in this study showed no significant differences between Negro and white pupils. Special focus in the research literature has depicted Negro pupils with lower self-concepts with the attendant feelings of inferiority (Passow, 1967; Bloom, *et al*., 1965; Ausubel and Ausubel, 1963; and Witty, 1967). Additional research may be needed before adequate explanation can be made for the lack of any significant differences in personality measures between Negro and white pupils found in this study.

Compensatory Education

In this study children who scored low on first grade readiness tests also scored low on achievement and personality tests four years later. Several questions remain unanswered. Could this low attainment have been prevented? How? Had the level of readiness been raised would there have been proportionate dividends in achievement and personality adjustment? Recent advocates of preschool programs and other compensatory efforts which attempt to modify unfavorable environmental and experiential conditions are optimistic and suggest that the spiral of failure and personal devaluation can be reversed appreciably (Ausubel, 1963; Hunt, 1964; Kirk, 1963; Gray and Klaus, 1963).

Barbe (1967, p. 106) discussed the question, "Can anything be done for the educationally retarded and disadvantaged?" In this question was implied the need for something extra, or remedial, in supplementing standard educational procedures. Various intervention treatments have established that relatively stable characteristics can be modified (Hunt, 1961; and Bloom, 1964). It has been well documented that culturally deprived children, because of inadequate pre-school experiences, often are diagnosed as unready for standard school offerings. This, according to Havighurst and others (1967, p. 31)

> . . . leads either to the obvious prescription of compensatory instruction or to the prognosis of low expectations and aspirations. School-created compensatory experiences prior to the primary grades or remedial work after a child enters these grades are intended to bring pupils into the mainstream of school life; without one or the other, many are marked for low attainment and failure.

The fact that slightly over forty percent of the total population in this study had below average readiness scores upon entering first grade suggests a dire need for pre-school experiences designed to raise the level of readiness. This suggestion finds support from numerous authorities (Brunner, 1967; Gray and Klaus, 1963; and Bloom, 1965).

Differential programs for boys and girls need further study. In this study the usual sex difference in achievement was found. The need for flexibility of educational offerings is implied where provisions are made for multiple levels of learning. These same statements regarding sex differences could apply to race differences in which white pupils consistently excelled Negro pupils on measures of achievement.

The problems regarding inappropriate grade placement of pupils need extensive study. Alternatives to the traditional system of promotion-retention should be explored. Fruitful areas of research involve the continuous need to adjust curricular offerings to pupil characteristics.

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